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ENVIRONMENTAL HEALTH SERIES
Air Pollution

A COMPILATION OF SELECTED AIR POLLUTION EMISSION CONTROL REGULATIONS AND ORDINANCES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

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A COMPILATION OF SELECTED AIR POLLUTION EMISSION CONTROL REGULATIONS AND ORDINANCES

Prepared by

Abatement and Control Development Programs

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Bureau of Disease Prevention and Environmental Control
National Center for Air Pollution Control
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The ENVIRONMENTAL HEALTH SERIES of reports was established to report the results of scientific and engineering studies of man's environment: The community, whether urban, suburban, or rural, where he lives, works, and plays; the air, water and earth he uses and reuses; and the wastes he produces and must dispose of in a way that preserves these natural resources. This SERIES of reports provides for professional users a central source of information on the intramural research activities of the Centers in the Bureau of Disease Prevention and Environmental Control, and on their cooperative activities with State and local agencies, research institutions, and industrial organizations. The general subject area of each report is indicated by the letters that appear in the publication number; the indicators are

AP - Air Pollution

RH - Radiological Health

UIH - Urban and Industrial Health

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A COMPILATION OF SELECTED AIR POLLUTION EMISSION CONTROL REGULATIONS AND ORDINANCES

INTRODUCTION

This compilation contains selected sections of many emission control regulations and ordinances. It has been prepared to provide state and local air pollution control agencies, industries, and other interested people with selected examples of the many types of regulations and ordinances in use today. All sections of regulations and ordinances included have been copied directly from the original text of individual state and local laws.

The regulations and ordinances have been arranged in such a manner that each section of this report is a compilation of laws pertaining to a specific type of pollutant or pollutant source. These sections include Smoke Emissions and Equivalent Opacity Regulations, Particulate Emissions from Fuel Burning Plants, Particulate Emissions from Refuse-burning equipment, Particulate Emissions from Manufacturing Processes, Particulate Emissions from Asphalt Batching Plants, Sulfur Compound Emissions, Organic Solvent Emissions, Hydrocarbon Emissions, Fluoride Emissions, Motor Vehicle Emissions, Odor Emissions, and Zoning Ordinances.

The regulations and ordinances compiled were selected to represent the different methods of controlling emissions by law and to represent varying degrees of control.

The definitions used were for the most part taken directly from existing regulations and ordinances. Some were picked selectively to provide what we feel are very good definitions while others were chosen because of their wide use by many states and communities.

DEFINITIONS TYPICALLY INCLUDED IN AIR POLLUTION ORDINANCES

1. Aerosol. A dispersion or any suspension of small solid or liquid particles or any combination thereof in the air or other gaseous medium.

2. Ashes. Includes cinders, fly ash or any other solid material resulting from combustion, and may include unburned combustibles.

3. ASME. The American Society of Mechanical Engineers.

4. ASTM. The American Society for Testing Materials.

5. Air Contaminant. Any smoke, soot, fly ash, dust, cinders, dirt, noxious or obnoxious acids, fumes, oxides, gases, vapors, odors, toxic or radioactive substance, waste, particulate, solid, liquid or gaseous matter, or any other materials in the outdoor atmosphere, but excluding uncombined water.

6. Air Pollution. The presence in the outdoor atmosphere of one or more air contaminants or combinations thereof in such quantities and of such duration that they are or may tend to be injurious to human, plant, or animal life, or property, or that interfere with the comfortable enjoyment of life or property or the conduct of business.

7. Atmosphere. The air that envelops or surrounds the earth. Where air pollutants are emitted into a building not designed specifically as a piece of air pollution control equipment, such emission into the building shall be considered an emission into the atmosphere.

8. Cinders. Particles not ordinarily considered as fly ash or dust because of their greater size, consisting essentially of fused ash and/or unburned matter.

9. Cleaning Fires. The act of removing ashes from the fuel bed or furnace.

10. Combustion Contaminants. Particulate matter discharged into the atmosphere from the burning of any kind of material containing carbon in a free or combined state.

11. Combustible Refuse. Any combustible waste material containing carbon in a free or combined state other than liquids or gases.

12. Condensed Fumes. Minute solid particles generated by the condensation of vapors from solid matter after volatilization from the molten state, or generated by sublimation, distillation, calcination, or chemical reaction when these processes create airborne particles.

13. Domestic Refuse-Burning Equipment. Any refuse-burning equipment or incinerator used for a single family residence, or for two residences either in duplex or double house form, or for multiple-dwelling units in which such equipment or incinerator serves fewer than three apartments.

14. Dusts. Minute solid particles released into the air by natural forces or by mechanical processes such as crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, sweeping, etc.

15. Dust-Separating Equipment. Any device for separating dust from the air or gas medium in which it is carried.

16. Flue. Any duct, passage, stack, chimney, or conduit permitting air contaminants to be emitted into the open air.

17. Fly Ash. Particulate matter capable of being gas-borne or air-borne and consisting essentially of fused ash and/or burned or unburned material.

18. Fuel. Any form of combustible matter - solid, liquid, vapor, or gas excluding combustible refuse.

19. Fuel-Burning or Combustion Equipment or Device. Any furnace, fuel-burning equipment, or boiler used for the burning of fuel, or for the emission of products of combustion, or used in connection with any process which generates heat and may emit products of combustion.

20. Fuel-Burning Equipment, Mechanical. Any fuel-burning or combustion equipment or device incorporating a device by means of which fuel is mechanically introduced from outside the furnace into the zone of combustion.

21. Fugitive Dust. Solid airborne particulate matter emitted at or near ground level from any source other than a flue.

22. Furnace. An enclosed space provided for the ignition and/or combustion of fuel.

23. Incinerator. A combustion device specifically designed for the destruction, by high temperature burning, of solid, semi-solid, liquid, or gaseous combustible wastes and from which the solid residues contain little or no combustible material.

24. Low Volatile Solid Fuel. A solid fuel, the volatile content of which is 23% or less on an ash free and moisture free basis.

25. Mist. A suspension of any finely-divided liquid in any gas or atmosphere.

26. Multiple Chamber Incinerator. Any article, machine, equipment, contrivance, structure or part of a structure, used to dispose of combustible refuse by burning, consisting of three or more refractory lined combustion furnaces in series, physically separated by refractory walls, interconnected by gas passage ports or ducts and employing adequate design parameters necessary for maximum combustion of the material to be burned. The refractories shall have a Pyrometric Cone Equivalent of at least 17, tested according to the method described in the American Society for Testing Materials, Method C-24.

27. Odor. That property of an air contaminant that affects the sense of smell.

28. Oil Burners. Any device for the introduction of vaporized or atomized fuel oil into a furnace.

29. Oil-Effluent Water Separator. Any tank, box, sump or other container in which any petroleum or product thereof, floating on or entrained or contained in water entering such tank, box, sump or other container, is physically separated and removed from such water prior to out-fall, drainage, or recovery of such water.

30. Open Fire. Any fire from which the products of combustion are emitted directly into the open air without passing through a stack or chimney.

31. Particulate Matter. Any material, except uncombined water, that exists in a finely divided form as a liquid or solid.

32. Person. Any person, firm, association, organization, partnership, business trust, corporation, company, contractor, supplier, installer, user or owner, or any state or local governmental agency or public district or any officer or employee thereof.

33. Process Weight. The total weight of all materials introduced into a source operation, including solid fuels, but excluding liquids and gases used solely as fuels, and excluding air introduced for purposes of combustion.

34. Process Weight Rate. A rate established as follows:

(a) For continuous or long-run steady-state source operations, the total process weight for the entire period of continuous operation or for a typical portion thereof, divided by the number of hours of such period or portion thereof.

(b) For cyclical or batch unit operations, or unit processes, the total process weight for a period that covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such a period.

Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this definition (34), the interpretation that results in the minimum value for allowable emission shall apply.

35. Processes or Process Equipment. Any action, operation, or treatment embracing chemical, industrial, or manufacturing factors, such as heat treating furnaces, by-product coke plants, core-baking ovens, mixing kettles, cupolas, blast furnaces, open-hearth furnaces, heating and reheating furnaces, puddling furnaces, sintering plants, Bessemer converters, electric steel furnaces, ferrous and non-ferrous foundries, kilns, stills, dryers, roasters, and equipment used in connection therewith, and all other methods or forms of manufacturing or processing that may emit smoke, particulate matter, or gaseous matter.

36. Ringelmann Chart. The chart published by the U. S. Bureau of Mines on which are illustrated graduated shades of grey to black for use in estimating the light obscuring capacity of smoke.

37. Source Sample. A sample of the emission from an air contamination source, collected for analysis from within a stack.

38. Smoke. Small gas-borne particles resulting from incomplete combustion, consisting predominantly, but not exclusively, of carbon, ash, and other combustible material.

39. Smoke Unit. The number of "smoke units" is obtained by multiplying the smoke density in Ringelmann numbers by the time of occurrence in minutes. For the purpose of this calculation, a Ringelmann density reading is made at least once per minute during the period of observation. The sum of the Ringelmann density readings (made once per minute) during the period of observations would equal the number of smoke units.

40. Soot. Agglomerated particles consisting mainly of carbonaceous material.

41. Source Operation. The last operation preceding the emission of air contaminants, which operation (a) results in the separation of the air contaminants from the process materials or in the conversion of the process materials into air contaminants, as in the case of combustion of fuel; and (b) is not an air pollution abate-

ment operation.

42. Stack or Chimney. Any flue, conduit, or duct arranged to conduct an effluent to the open air.

43. Stack Spray. A nozzle or series of nozzles installed in a stack above the breeching, used to inject wetting agents at high pressure to suppress the discharge of particulate matter from the stack.

44. Standard Conditions. A gas temperature of 60 degrees Fahrenheit and a gas pressure of 14.7 pounds per square inch absolute (psia).

45. Stokers. Any mechanical device that feeds solid fuel uniformly onto a grate or hearth within a furnace.

46. Unit Operation. Methods where raw materials undergo physical change; methods by which raw materials may be altered into different states, such as vapor, liquid, or solid without changing into a new substance with different properties and composition.

47. Unit Process. Reactions where raw materials undergo chemical change; where one or more raw materials are combined and completely changed into a new substance with different properties and composition.

48. Vapor. The gaseous form of a substance normally in the liquid or solid state.

49. Volatile or Volatile Matter. The gaseous constituents of solid fuels as determined by the procedure defined in the ASTM method amended or revised to the current date.

SMOKE EMISSIONS AND EQUIVALENT OPACITY REGULATIONS

ALLEGHENY COUNTY, PENNSYLVANIA
SMOKE CONTROL ORDINANCE
(effective July 5, 1960)

1305. GENERAL

.1 The provisions of this section shall apply to all classes of processes and equipment covered by these Rules and Regulations.* Unless otherwise provided herein, the Director shall determine such classification.

.2 The Ringelmann Chart, hereby made a part of these Rules and Regulations by reference, shall be used for grading the appearance, density, or shade of smoke. The Smokescope may be used to determine the appearance, density, or shade of smoke as graded by the Ringelmann Chart.

.3 The production or emissions of dense smoke within the County of Allegheny is prohibited. No person shall cause, suffer, or allow to be emitted into the open air from any fuel-burning equipment, internal combustion engine, premise, open fire, or stack, smoke the appearance, density, or shade of which is darker than No. 2 of the Ringelmann Chart.

1309.3 INCINERATORS OF ALL TYPES:

(b) Smoke emitted into the atmosphere from any incinerator shall be of an appearance, density, or shade lighter than No. 1 of the Ringelmann Chart.

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*Classification groups include section 1306. entitled "Railroad Locomotives, Boats, and Other Vehicles; section 1307. entitled "Power Plants, Heating Plants, and Domestic Heating Plants"; section 1308. entitled "Steel and Allied Industries", and section 1309. entitled "Miscellaneous Pollutants from Combustion". Sections 1307., 1309., and 1308. are listed under the following three sections of this report, respectively.

CITY OF CHICAGO, ILLINOIS
AIR POLLUTION CODE
CHAPTER 17
(amended January 1, 1965)

17-22. Open fires other than those covered by section 17-31 of this code, diesel motor vehicles and all fuel burning, combustion or process equipment, incinerators or devices shall meet the requirements of section 17-23. (Amend. Coun. J. 7-1-63, p. 579.)

17-23. It shall be unlawful within the City of Chicago and within one mile of the corporate limits for any person, owner, agent, operator, firm or corporation to permit to cause, suffer or allow the emission of any smoke* from any source whatever of a density, shade or opacity equal to or greater than that described as #2 on the Ringelmann chart as published by the United States Bureau of Mines provided that the following exceptions to the provisions of this section shall be permitted for fuel burning equipment.

(1) For a period or periods aggregating 4 minutes in any 30 minutes of a density, shade or opacity equal to but not greater than that described as #2 on the Ringelmann chart.

(2) For a period or periods aggregating 4 minutes in any 60 minutes of a density, shade or opacity equal to but not greater than that described as #3 on the Ringelmann chart when building a new fire. (Amend. Coun. J. 7-1-63, p. 579.)

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* Chicago definition of smoke is as follows: Smoke is small gas-borne particles other than water, that forms a visible plume in the air from a source of atmospheric pollution.

CITY OF CLEVELAND, OHIO
AIR POLLUTION CODE
ORDINANCE NO. 428-A-62
CHAPTER 5 - PROHIBITED EMISSIONS
(effective June 20, 1962)

Section 4.0501. SMOKE

No owner, occupant or person in charge, by himself, his agent or employee, shall cause, suffer or allow smoke in excess of the following limitations to be discharged from any stack or vent within the City of Cleveland.

Ringelmann Chart No.	Railroads and Steamships	Other Combustion Devices Except Incinerators	Incinerators
1	No limitation	No limitation	No limitation
2	No limitation	10 minutes in any 1 hour	Not allowed
3	RR-1/2 minute in any 4 min. SS-6 minutes in any 1 hour	6 minutes in any 8-hour period	Not allowed
4	Not allowed	Not allowed	Not allowed
5	Not allowed	Not allowed	Not allowed

Section 4.0502. DUST OR FUME.

No owner, occupant or person in charge, by himself, his agent or employee, shall cause, suffer or allow any dust or fume having a color other than black to be discharged from any stack or vent within the City of Cleveland in excess of such density or opacity in shade as that designated as No. 2 on the Ringelmann Chart. When the presence of uncombined water is the sole reason for the failure to meet the limitations in this section, these limitations shall not apply.

AIR QUALITY CONTROL CODE
OF THE
CITY OF PORTLAND, OREGON
(Passed February 27, 1964)

ARTICLE 15. EMISSIONS PROHIBITED.

Section 13-1501. SMOKE DISCHARGE.

(New Section substituted for previous Section 13-1501 by Ordinance No. 122783, passed and effective June 30, 1966.)

(a) A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:

1. As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or

2. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection (a) 1 of this code.

(b) Where the presence of uncombined water is the only reason for the failure of an emission to meet the limitations of Section 13-1501 (a) that section shall not apply.

(c) No person shall cause, let, permit, suffer or allow the discharge of exhaust from any motor vehicle, in which the shade is darker than No. 1 on the Ringelmann Chart of opacity equivalent to said shade, except that smoke the shade or opacity of shade No. 2 on the Ringelmann Chart is permissable for a period not to exceed 5 seconds.

Other jurisdictions using this smoke standard are:

Los Angeles County, California
San Bernardino County, California
Jefferson County, Kentucky (Louisville)

CITY OF POUGHKEEPSIE, NEW YORK
AIR POLLUTION CONTROL ORDINANCE
(effective December 1, 1951)

VI. Applicability

A. Sources

Domestic installations; apartment house, office building, school, hotel, loft building, hospital and similar installations; stationary installations; railroad locomotives; building fresh fires; other stationary installations.
Regulated pursuant standards of Table I. /sec.3/.

B. Specific Pollutants

1. Smoke - discharge or emission of smoke shade or density darker than that specified and for duration shown in Table I. /sec. 3/.

Ringelmann Chart or other charts of equivalent shades of grey incorporated into ordinance by reference.

TABLE I

TYPE OF INSTALLATION	LIMITING DENSITY, SHADE OR APPEARANCE OF SMOKE
A. Domestic installations primarily for heating and hot water, in one and two family dwellings.	Not darker than shade #1.
B. Installations, primarily for heating and hot water in apartment houses, office buildings, schools, hotels, loft buildings, hospitals and other installations of similar character.	Not darker than Shade #2 except that smoke not darker than Shade #3 is permitted for not more than a total of 4 minutes in any period of 30 minutes.
C. All other stationary installations except those included in Paragraph F hereof.	Not darker than Shade #2 except that smoke not darker than Shade #3 is permitted for not more than a total of 4 minutes in any period of 30 minutes.
D. Railroad Locomotives.	Not darker than Shade #2 except that smoke not darker than Shade #3 is permitted for not more than a total of 1 minute in any period of 6 minutes for a locomotive in motion, or for not more than a total of 4 minutes in any period of 30 minutes for a locomotive not in motion.

E. For building a wholly fresh fire in a cold fire box.	In railroad locomotives not darker than Shade #3 is permitted for not more than 12 consecutive minutes in any period of 24 hours; in other installations, not darker than Shade #3 is permitted for not more than 20 consecutive minutes while such fire is being built.
F. For installations using a fuel input in excess of 25,000,000 BTU per hour, the primary purpose of which is to provide standby and emergency facilities for maintaining essential public utility services.	Not darker than Shade #2 except that smoke not darker than Shade #3 is permitted for not more than a total of 10 minutes in any period of 30 minutes.

STATE OF NEW JERSEY
AIR POLLUTION CONTROL CODE
CHAPTER IV
(effective January 1, 1958)

Section 2. EMISSIONS PROHIBITED AND STANDARDS OF MEASUREMENT

2.1 No person shall cause, suffer, allow, or permit smoke from any fuel-burning equipment, the shade or appearance of which is darker than No. 2 of the Ringelmann Smoke Chart, to be emitted into the open air.

2.2 The provisions of Section 2.1 shall not apply to:

(a) Smoke emitted during the cleaning of a fire box or the building of a new fire, the shade or appearance of which is not darker than No. 3 of the Ringelmann Smoke Chart for a period or periods aggregating no more than 3 minutes in any 15 consecutive minutes.

(b) Smoke from locomotives the shade or appearance of which is equal to but not darker than No. 3 of the Ringelmann Smoke Chart for a period or periods aggregating no more than 30 seconds in any 3 consecutive minutes, or smoke of said density for a period or periods aggregating no more than 4 minutes in any 15 consecutive minutes when building a new fire.

(c) Smoke resulting from any fire ignited solely for the purpose of training or research in fire protection or prevention.

Other jurisdictions using this smoke standard are:

East St. Louis, Illinois
Newark, New Jersey

CITY OF NEW YORK, NEW YORK

AIR POLLUTION CONTROL CODE

ARTICLE 9. EMISSION STANDARDS

Sec. 9.03 EMISSION OF AIR CONTAMINANT: STANDARD SMOKE CHART*

(a) No person shall cause or permit the emission of an air contaminant of:

(1) A density which appears as dark or darker than No. 3 on the Standard Smoke Chart, or of an opacity which obscures vision to a degree equal to or greater than smoke of No. 3 density on the Standard Smoke Chart; or

(2) A density which appears as dark or darker than No. 2 on the Standard Smoke Chart, but less than No. 3 on said Chart, or of an opacity which obscures vision to a degree equal to or greater than smoke of No. 2 density on the Standard Smoke Chart, but less than No. 3 on said Chart, if such emission continues for longer than 2 minutes in the aggregate in any 60 minute period.

(3) A density which appears as dark or darker than No. 1 on the Standard Smoke Chart, but less than No. 2 on said Chart, or of such opacity as to obscure vision to a degree equal to or greater than smoke of No. 1 density on the Standard Smoke Chart, but less than No. 2 on said Chart, if such emission continues for longer than 4 minutes in the aggregate in any 60 minute period.

(b) The density or opacity of an air contaminant shall be measured at the point of its emission, except:

(1) When the point of emission cannot be readily observed, it may be measured at an observable point on the plume nearest the point of emission, or

(2) In the case of air contaminant emitted from a source outside of New York, it shall be measured after the plume crosses the jurisdictional boundary of New York City.

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*The Standard Smoke Chart is the Ringelmann Chart, as published by the U. S. Bureau of Mines, photographically reduced to 1/18th in size for use in the field.

NIAGARA COUNTY (N. Y.) SANITARY CODE

CHAPTER IX

AIR POLLUTION

(effective January 1, 1967)

2. POLLUTION OF THE ATMOSPHERE

a. No person shall operate or maintain any building, equipment, vessel, stationary or locomotive engine, device, container, pipe line, vehicle, process, place or premises, so as to cause, suffer or allow smoke, cinders, gas, vapors, fumes, dust, offensive or noxious odors, particulates, substances or liquids to escape or be discharged into the atmosphere in or from any such building, vessel, or place in quantities sufficient to endanger the public health.

b. No person shall operate any fuel burning equipment or other combustion installation constructed after February 1, 1967, so as to produce or permit the escape of smoke regardless of how produced or discharged of a density darker than No. 1 of the Ringelmann Chart or an equivalent standard except when allowed in Section 2,c.

No person shall operate any fuel burning equipment or other combustion installation constructed prior to February 1, 1967, so as to produce or permit the escape of smoke regardless of how produced or discharged of a density darker than No. 2 of the Ringelmann Chart or an equivalent standard except when allowed in Section 2,c.

c. When building a new fire, tube blowing, or when breakdown of equipment occurs such as to make it evident that the emission was not reasonably preventable, smoke which is equal to, but not darker than, No. 3 of the Ringelmann Chart or equivalent standard may be emitted for a period or periods aggregating three minutes in any thirty-minute period.

d. Special equipment to prevent frost damage may be used in agricultural operations with the concurrence of the Commissioner.

e. Smoke may be emitted for purposes of training or research when approved by the Commissioner.

f. When any fuel burning equipment with an input capacity equal to or greater than one million BTU per hour has caused a smoke nuisance, as determined by the Commissioner, it shall be equipped with an air contaminant detector which will automatically sound an audible alarm when smoke darker than No. 2 of the Ringelmann Scale is produced by the fuel burning equipment. The air contaminant detector shall be located in the flue of the fuel burning equipment and shall be maintained in proper operating condition at all times.

MISSOURI AIR CONSERVATION COMMISSION

(St. Louis Metropolitan Area)

AIR POLLUTION CONTROL REGULATIONS

(Effective - March 24, 1967)

REGULATION VIII RESTRICTION OF EMISSION OF VISIBLE AIR CONTAMINANTS

A. Restrictions Applicable to Existing Installations

No person shall discharge into the atmosphere from any single source of emission whatsoever any air contaminant

1. of a shade or density equal to or darker than that designated as No. 2 on the Ringelmann Chart, or
2. of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection A (1) of this regulation.

This section A shall not apply to existing incinerators.

B. Restrictions Applicable to New Installations and All Incinerators

No person shall discharge into the atmosphere from any single source of emission whatsoever any air contaminant

1. of a shade or density equal to or darker than that designated as No. 1 on the Ringelmann Chart, or
2. of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection B (1) of this regulation.

C. Exceptions

A person may discharge into the atmosphere from any single source of emission for a period or periods aggregating not more than six minutes in any sixty minutes air contaminants

1. of a shade or density not darker than No. 2 on the Ringelmann Chart, or
2. of such opacity as to obscure an observer's view to a degree not greater than does smoke described in subsection C(1) of this regulation.
3. Where the presence of uncombined water is the only reason for failure of an emission to meet the requirements of Sections A or B of this regulation, such sections shall not apply.
4. The provisions of Section A of this regulation shall not apply to the following:
   a. Transfer of molten metals
   b. Emissions from transfer ladles
   c. Coke ovens when pushing coke from oven
   d. Water quenching of coke on discharge from ovens
   e. Existing grey iron jobbing cupolas as defined in Regulation IV.

D. Method of Measurement

1. The Ringelmann Chart published and described in the U. S. Bureau of Mines Information Circular 7718 or the U. S. Public Health Service Smoke Inspection Guide as described in the Federal Register, Title 42, Chapter 1, Subchapter F, Part 75, shall be used in grading the shade or opacity of visible air contaminant emissions. The Executive Secretary may specify other means of measurement which give comparable results or results of greater accuracy. The two publications described in this subsection are hereby made a part of this regulation by reference.

JURISDICTIONS USING
EQUIVALENT OPACITY

The following jurisdictions (and others not here listed) are presently using an equivalent opacity standard in conjunction with their black smoke limitations:

California (entire state)
Chicago, Illinois
Cleveland, Ohio
Colorado (entire state)
Cook County, Illinois
Dade County, Florida
East Chicago, Indiana
East St. Louis, Illinois
Florida (entire state)
Gary, Indiana
Hammond, Indiana
Jefferson County, Kentucky
Kentucky (entire state)
Muskegon, Michigan
Newark, New Jersey
New York, New York
Orange County, California
Portland, Oregon
Providence, Rhode Island
Riverside, California
St. Louis, Missouri
St. Louis County, Missouri
San Bernardino, California
San Francisco Bay Area, California
Washington, D. C.

PARTICULATE EMISSIONS FROM FUEL-BURNING PLANTS

(Additional types of regulations are listed in the zoning ordinances of Evansville and Porter County, Indiana, and Cook and DuPage Counties in Illinois, in the "Zoning Ordinances" section of this compilation.)

ALLEGHENY COUNTY, PENNSYLVANIA
SMOKE CONTROL ORDINANCE
(effective July 5, 1960)

1305.3 (Listed under "Smoke Emission and Equivalent Opacity Regulations" section of this report.)

1305.4 (a) No person shall cause, suffer, or allow to be emitted into the atmosphere from any fuel-burning equipment or premise, or to pass a convenient measuring point near the stack outlet, particulate matter in the gases to exceed 0.65 lb. per 1,000 lb. of gases adjusted to 50 percent excess air in the products of combustion. The foregoing requirement shall be calculated in accordance with the American Society of Mechanical Engineers "Power Test Codes, Test Code for Dust Separation Apparatus, PTC-21-1941" procedure.

1307. POWER PLANTS, HEATING PLANTS, AND DOMESTIC HEATING PLANTS.

.1 The provisions of this section shall apply to power plants, heating plants, and domestic heating plants.

.2 The following exception to the provisions of Section 1305.3 and 1305.4 shall be permitted: when building a new fire, when manually cleaning a fire, when blowing tubes and flues, or when cleaning air pollution control equipment, in a power plant, heating plant, or domestic heating plant, smoke may be emitted of an appearance, density, or shade darker than No. 2 of the Ringelmann Chart, and particulate matter in excess of limitations may be emitted, for a period or periods aggregating not more than six (6) minutes in any sixty (60) minute period.

CITY OF CHICAGO, ILLINOIS
AIR POLLUTION CODE
CHAPTER 17
(amended January 1, 1964)

17-24. Subject to the provisions of Section 17-25, it shall be unlawful within the City of Chicago for any person owning or in charge of any fuel-burning, combustion or process equipment or device, or any portable boiler, to cause, suffer or allow the emission from any such source of any particulate matter except in conformity with the limits set forth as follows:

(1) The basic limitation on the average emission into the atmosphere of particulate matter from any single source of emission shall be 0.35 grains per cubic foot of gas measured at a temperature of 60 degrees Fahrenheit and a pressure of 30 inches of mercury, under steady conditions, provided that for emissions at levels 100 feet or more above grade, the basic limitation shall be increased by the amount of particulate matter of less than 10 microns in size, if any, up to a maximum increase of 0.03 (H/100) grains per scf, where H is the height of discharge in feet above grade.

(2) The limitation on the emission of that portion of the particulate matter which is 44 microns in size or larger from any single such source shall be 0.21 grains per scf.

17-38. It shall be unlawful for any person to operate any surface burning type (hand-fired) of combustion equipment with any solid fuel other than a low volatile solid fuel unless:

(1) The Director has issued a Certificate of Operation therefore in accordance with Section 17-55 or Section 17-60, authorizing the use of other than low volatile solid fuel with such equipment;

(2) The Director has approved the equipment or type of equipment in accordance with Section 17-44;

(3) The Director has issued an Allowable Fuel Certificate for such equipment in accordance with Sections 17-41, 17-42, and 17-43; or

(4) The Appeal Board has granted an individual variance for such equipment in accordance with Section 17-74.

The foregoing restrictions shall not apply with respect to the burning of combustible refuse in such equipment in accordance with rules and regulations issued by the Director.

17-39. A solid fuel containing volatile matter in excess of 23% on an ash free basis shall be considered a low volatile solid fuel provided it meets the same standards in regard to smoke production as a low volatile solid fuel, and subject to the following conditions in order to ascertain whether or not such standards are met:

Adequate supplies of such solid fuel shall be made available to the Director to conduct such reasonable tests as he shall deem necessary to determine that such fuel meets the standards herein before established. The reasonable expense of any such tests shall be borne by the person seeking the approval of such solid fuel.

The Director shall maintain and, upon request, furnish a list of brands or trade names of solid fuels which have been tested for conformity with the provisions of this chapter and which as a result of such tests have been approved.

17-40. Solid fuel, other than low volatile solid fuel, may be used or consumed only in mechanical combustion equipment or mechanically fired apparatus; except that after suitable inspections and tests have proven to the Director that any combination of surface burning type (hand-fired) of equipment and appurtenances and fuel can comply with the emission limitations established by or under this chapter, the Director shall approve the use of such combination of equipment and fuel.

CITY OF DETROIT, MICHIGAN
OFFICIAL AIR POLLUTION CONTROL CODE
ORDINANCE NO. 167-E
ARTICLE 2
(effective November 6, 1964)

Section 2.4A* It shall be unlawful within the City of Detroit for any person, firm or corporation to permit the emission of any particulate matter from any source whatsoever in excess of the emission schedule listed below:

EMISSION SCHEDULE

SOURCE OF EMISSION		MAXIMUM ALLOWABLE EMISSION POUNDS PARTICULATE PER THOUSAND pounds of exhaust gas(a) (g)	
Fuel Burning	Capacity Rating 1000# of steam/hr.	Design (b)	Operating (b)
Pulverized Fuel Fired	0 to 300	0.50 to 0.20 (c)	0.60 to 0.30 (c)
	300 and over	0.20	0.30
All Other Modes of Fuel Firing	0 to 100		0.65
	100 to 300		0.65 to 0.45 (c)
	300 to 800		0.45 to 0.30 (c)
	800 and over		0.30

(a) Fuel burning and incinerator emission limitations shall be corrected to 150 per cent total air.

(b) The operating limitation allows for gradual deterioration of equipment performance during extended periods of continuous operation where it is impractical to maintain design conditions for these extended periods. (See Regulation No. 1, Section 2.4 ** for further details on intent.)

(c) Emission limitation for specific ratings are determined by linear interpolation between the ranges shown.

(g) When wet collectors or scrubbers are utilized, that portion of water vapor in the exhaust gases which was added for collector or scrubber requirements shall be deleted from the total exhaust gases in calculating the particulate emission rate.

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*Wayne County, Michigan also uses this standard except for .40 to .20 and .50 to .30 pounds/thousand pounds for pulverized fuel burning equipment under 300,000 pounds of steam per hour.

**Page 21

Supplemental Regulations

Section 2.4

Regulation No. 1 DESIGN AND OPERATING EMISSION LIMITATIONS

This Regulation clarifies the intent of Section 2.4A for those cases where both design and operating emission limitations are stipulated for a given operation.

The design emission standard shall be met when the system is field operated as close to design conditions as is reasonably feasible. In addition, before a permit is issued for the installation of a collector sufficient data will be required to be submitted to the Department in the form of tests, drawings, calculations, etc., to prove that when the collector is operated at design conditions the particulate loading will not exceed the design emission limitation.

The operating emission limitation is less stringent than tne design emission limitation and recognizes that field operating conditions do not always meet design conditions and that this could cause a temporary degradation in overall equipment performance. The more lenient operating emission standard shall not be used as a basis for design. It also shall not be used as a basis for reducing design collector efficiency to effectuate savings in operating cost.

Section 4.9

Regulation No. 1 COLLECTOR REQUIREMENT FOR SINGLE RETORT STOKER-FIRED BOILERS

New forced draft solid fuel fired boilers of less than 400 H. P. nominal rating and existing boilers in this category when stack or breeching is replaced shall be provided with a low draft loss collector or drop out box approved by the Bureau.

Explanation

While the proposed emission limitations of Section 2.4 would quite possibly make this requirement necessary it is felt that the above statement would simplify permit issuance and reduce the large amount of stack sampling that could be involved if emission limitations were the only requirement. It is intended to apply primarily to new single retort underfeed stoker fired plants and existing installations where practical.

CITY OF GARY, INDIANA
AIR QUALITY CONTROL ORDINANCE
(effective April 4, 1967)

ARTICLE VI

Section 6.2 Emission of Particulate Matter from Fuel-Burning Equipment:

No person shall cause, suffer, or allow to be emitted into the outdoor atmosphere from any fuel-burning equipment or premises, or to pass a convenient measuring point near the stack outlet, particulate matter in the gases to exceed 0.60 lbs. per 1,000,000 BTU heat input for fuel burning units using less than 10,000,000 BTU per hour total input. For single units using greater than 10,000,000 BTU per hour total input, Figure 1 as herein set forth on page 21 hereof will be used to determine the allowable particulate emission limitation. If two or more units connect to a single stack or chimney, each unit shall for the purpose of computing the maximum allowable emission rate, be considered a separate entity with the allowable emission rate for the stack or chimney the sum of the individual computations.

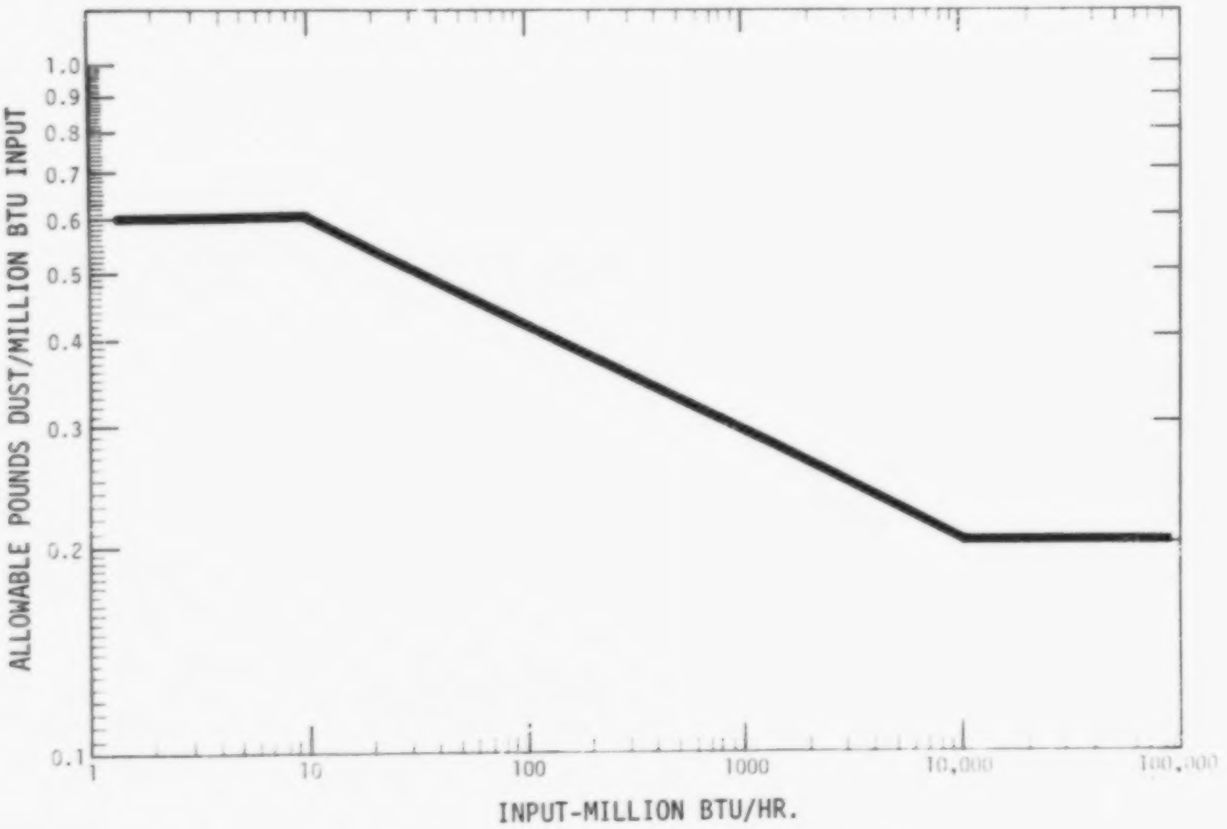

FIGURE 1 PARTICULATE EMISSION LIMITS

For the purposes hereof, the heat in solid fuel burned shall be the aggregate heat content, based on the higher heating value, of all solid fuels whose products of combustion pass through such stack or chimney. For a heat content between any two consecutive heat contents stated in this table, the fly ash limitation shall be as determined by interpolation.

Section 2. - CONTROL AND PROHIBITION OF FLY ASH

2.1 (b) NEW INSTALLATIONS

Heat in Fuel Burned British Thermal Units per Hour	Fly Ash Rate of Emission Pounds per Hour
1,000,000	1
100,000,000	50
400,000,000	150
1,000,000,000	320
2,000,000,000	570
3,000,000,000	800
4,000,000,000	1000
5,000,000,000	1200
6,000,000,000	1400
7,000,000,000	1600
8,000,000,000	1800
10,000,000,000	2200

For the purposes hereof, the heat in solid fuel burned shall be the aggregate heat content, based on the higher heating value, of all solid fuels whose products of combustion pass through such stack or chimney. For a heat content between any two consecutive heat contents stated in the above table, the fly ash limitation shall be as determined by interpolation.

COUNTY OF LOS ANGELES, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION IV. PROHIBITIONS

(amended June 1, 1956)

Rule 50. (Listed under "Smoke Emission and Equivalent Opacity Regulations" section of this report.)

Rule 53. (Amended 1-16-58) SPECIFIC CONTAMINANTS. A person shall not discharge into the atmosphere from any single source of emission whatsoever any one or more of the following contaminants, in any state or combination thereof, exceeding in concentration at the point of discharge:

a. (Does not pertain to this section. Listed under "Regulations Pertaining to Sulfur Compound Emission Control" section of this report.)

b. (Amended 1-16-58) Combustion Contaminants: 0.3 grain per cubic foot of gas calculated to 12 percent of carbon dioxide (CO_2) at standard conditions. In measuring the combustion contaminants from incinerators used to dispose of combustible refuse by burning, the carbon dioxide (CO_2) produced by combustion of any liquid or gaseous fuels shall be excluded from the calculation to 12 percent of carbon dioxide (CO_2).

Rule 62. Listed under "Regulations Pertaining to Sulfur Compound Emission Control" section of this report.

STATE OF NEW JERSEY
AIR POLLUTION CONTROL CODE
CHAPTER V

(effective July 1, 1958)

As Amended March 1, 1966

Section 2. CONTROL AND PROHIBITION OF FLY ASH

2.1 No person shall cause, suffer, allow or permit fly ash caused by the combustion of solid fuel to be discharged from any stack or chimney into the open air in excess of the quantity set forth in the following table:

Heat in Fuel Burned British Thermal Units per Hour	Fly Ash Rate of Emission Pounds per Hour
1,000,000	1
100,000,000	100
400,000,000	330
1,000,000,000	750
2,000,000,000	1,365
3,000,000,000	1,850
4,000,000,000	2,260
5,000,000,000	2,640
6,000,000,000	2,950
7,000,000,000	3,200
8,000,000,000	3,410
10,000,000,000	3,750

CITY OF NEW YORK, NEW YORK
AIR POLLUTION CONTROL CODE
ARTICLE 9. EMISSION STANDARDS
(effective October 1, 1964)

Section 9.09 EMISSION OF PARTICULATE MATTER FROM REFUSE BURNING EQUIPMENT, FUEL BURNING EQUIPMENT, OR EQUIPMENT USED IN A MANUFACTURING PROCESS: WEIGHT-RATE STANDARD.

No person shall cause or permit the emission of particulate matter from refuse burning equipment, fuel burning equipment, or equipment used in a manufacturing process if the emission from such equipment is in violation of the provisions of Section 9.03*or if the particulate matter emitted as measured in the flue exceeds the following weights:

(a) (Listed under "Regulations Pertaining to Particulate Emissions from Refuse Burning Equipment" section of this report.)

(b) In fuel burning equipment in which the preponderance of the particulate matter emitted is caused by the burning of fuel, 0.60 pounds for each million Btu per hour input if the equipment has a capacity rating of 10 million or less. If the capacity rating of the fuel burning equipment is more than 10 million, the amount of particulate matter which may be emitted for each million Btu input shall decrease as the capacity rating of the fuel burning equipment increases, as follows:

(1) no more than 0.46 pounds for each million Btu input from equipment having a capacity rating of 50 million;
(2) no more than 0.40 pounds for each million Btu input from equipment having a capacity rating of 100 million;
(3) no more than 0.30 pounds for each million Btu input from equipment having a capacity rating of 500 million;
(4) no more than 0.26 pounds for each million Btu input from equipment having a capacity rating of 1,000 million;
(5) no more than 0.23 pounds for each million Btu input from equipment having a capacity rating of 2,500 million;
(6) no more than 0.20 pounds for each million Btu input from equipment having a capacity rating of 5,000 million;
(7) no more than 0.19 pounds for each million Btu input from equipment having a capacity rating of 7,500 million;
(8) no more than 0.18 pounds for each million Btu input from equipment having a capacity rating of 10,000 million, or more.

The amount of particulate matter which may be emitted from fuel burning equipment having an intermediate capacity rating shall be determined by linear interpolation. If two or more fuel burning units are connected to a single flue, the total capacity rating of all fuel burning units connected to the flue shall be the capacity rating for the purpose of computing the amount of particulate matter which may be emitted. If a single fuel burning unit shall be the capacity rating for the purpose of computing the amount of particulate matter which may be emitted.

(c) (Does not pertain to this section. Listed under "Regulations Pertaining to Particulate Emissions from Manufacturing Processes" section of this report.)

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*Section on: Emission of Air Contaminant; Standard Smoke Chart

CITY OF ST. LOUIS, MISSOURI
AIR POLLUTION CONTROL ORDINANCE
54699
(Approved March 27, 1967)

Section 9. Maximum Allowable Emission of Particulate Matter from Fuel Burning Equipment Used for Indirect Heating.

A. General Provisions.

1. This Section applies to installations in which fuel is burned for the primary purpose of producing steam, hot water, or hot air or other indirect heating of liquids, gases, or solids and, in the course of doing so, the products of combustion do not come into direct contact with process materials. Fuels include but are not limited to coal, coke, lignite, coke breeze, fuel oil and wood but do not include refuse. When any products or by-products of a manufacturing process are burned for the same purpose or in conjunction with any fuel, the same maximum emission limitations shall apply.

2. The heat content of coal shall be determined according to ASTM method D-271-64 Laboratory Sampling and Analysis of Coal and Coke and ASTM method D-2015-62T Gross Calorific Value of solid Fuel by the Adiabatic Bomb Calorimeter as set forth in Appendix A.

3. For purposes of this section, the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or stacks. The heat input value used, shall be the equipment manufacturer's or designer's guaranteed maximum input, whichever is greater. The total heat input of all fuel burning units at a plant or on a premises shall be used for determining the maximum allowable particulate matter which may be emitted.

4. (a) Stack height, for purposes of this Section is defined as the vertical distance from the location at which gases passing through the stack enter the ambient air to the earth's surface under the stack.

(b) The provisions of subsection A-4 (a) apply in cases wherein there is only one stack serving a plant or premises and to cases in which there is more than one stack, all of equal height. In cases involving more than one stack all of equal height, the stack height shall be the height of one of such stacks.

(c) When a plant or premises has more than one stack and the stack heights are unequal, a weighted average stack height shall be used for purposes of determining maximum allowable emissions. This weighted average stack height shall be calculated in the following manner:

(1) Determine the heat input of each fuel burning unit expressed in Btu per hour. Add together the heat inputs of the units venting to each stack. If a single unit vents to more than one stack, prorate the Btu input to each stack in proportion to exhaust gas flows.

(2) Determine in feet the height of each stack as provided in 4 (a).

(3) Multiply the total heat input of units vented through each stack as determined in (1) by the height of the stack to which discharged.

(4) Add together the values obtained from (3).

(5) Add together the heat input for all of the units of the plant or premises.

(6) Divide the sum obtained in step (4) by the sum obtained in step (5). The quotient is the weighted average stack height expressed in feet.

(d) The stack height determined for a plant or premises in the manner described in subsections (a), (b) or (c) of this subsection 4 shall be reduced by the difference in elevation, if any, between the elevation of the ground at the base of the stack or stacks and any other point having a higher elevation and lying within one mile of the stack.

5. The amount of particulate matter emitted shall be measured according to the American Society of Mechanical Engineers, "Power Test Codes - PTC - 27" dated 1957 and entitled "Determining Dust Concentration in a Gas Stream" as set forth in Appendix C.

B. Emission Limitations.

1. No person shall cause or permit the emission of particulate matter from any fuel burning installation used for indirect heating from any stack or chimney in excess of the quantity determined from the formula incorporated in this section, as used in accordance with the following instructions:

(a) Determine the total heat input of the installation using provisions of subsections A (2) and A (3) of this Section. This value in Btu per hour is to be used in the formula as Q_h.

(b) Determine the stack height for the installation using all the applicable provisions of subsection A (4) of this Section. If the stack height so determined is less than 50 feet, use 50 feet as the value to be used in the formula as H_s.

(c) Select the applicable value of "A" to be used in the formula as follows:

(1) if the total heat input to the installation is equal to or greater than 4000 million Btu per hour, the value of "A" is 1.

(2) if the total heat input to the installation is less than 4000 million Btu per hour, the value of "A" is 0.67 for stack heights 150 feet or less as determined in B.1 (b) and is 0.80 for stack heights over 150 feet.

(d) The equation to be used for the calculation using Q_h, H_s and "A" as determined herein is

$$50 = \frac{2.22\ D\ Q_h^{0.75} \times 10^{-3}}{A\ H_s}$$

(e) Solve the equation for D which is in the units of pounds of particulate matter per million Btu heat input. If the value for D so obtained exceeds 0.6 then D shall have the value of 0.6.

(f) Multiply the value of D obtained from step (e) by the total heat input obtained in step (a) converted to millions of Btu heat input per hour.

(g) The total maximum particulate emission obtained in Step (f) shall apply when all of the gases from indirect heating units at a plant or on a premises are discharged to the ambient air from a single stack. When the gases from a plant or premises are discharged to the ambient air from more than one stack, the maximum allowable particulate matter emission rate determined as prescribed in Step (f) shall be reduced by dividing the value obtained by using preceding provisions of subsection B-1 by a factor taken from the following list for the number of stacks involved.

Number of stacks	Factor to be used to divide into the value obtained from use of subsection B-1
1	1.0
2	1.19
3	1.32
4	1.41
5	1.50
6 or more	1.56

2. No person shall cause or permit the emission of particulate matter from fuel burning equipment used for indirect heating from any single stack or chimney in a quantity greater than 0.6 pounds per million Btu of heat input to the equipment discharging to such stack or chimney.

3. All installations having a total heat input rate of 5 million Btu or more per hour shall be equipped with particulate matter emission control equipment which will remove at least 85 percent of the particulate matter in the gases arising from the installation and to be discharged to the ambient air.

4. No person shall cause or permit the emission of any particles larger than 60 microns in diameter from any stack subject to provisions of this section.

C. Procedure When More Than One Provision of This Section Applies.

When two or more provisions of this section specify a minimum allowable particulate emission applicable in a particular case, the one resulting in the lowest total weight of emission of particulate matter to the ambient air shall apply and the others shall not apply except that subsection B-4 shall apply in all cases.

D. Reference to ASME Publication.

The provisions of this section are based in part, on the publication of the American Society of Mechanical Engineers entitled "Recommended Guide for the Control of Dust Emission--Combustion for Indirect Heat Exchangers", ASME Standard No. APS-1; 1966, as set forth in Appendix B.

Section 10. Use of Hand-Fired Equipment Prohibited.

A. General.

1. This Section shall apply to fuel-burning equipment including, but not

limited to furnaces, heating and cooking stoves and hot water furnaces and heaters, in which fuel is manually introduced directly into the combustion chamber. It shall not apply to wood-burning stoves in dwellings, nor to fires used for recreational purposes nor to fires used solely for the preparation of food by barbecuing.

B. Prohibition.

1. After three years from the effective date of this ordinance no person shall operate or cause to be operated any hand-fired fuel burning equipment in the City of St. Louis.

2. The Commissioner may order that any hand-fired fuel burning equipment not be used at any time earlier than set forth in this section whenever such equipment has been found to be in violation of the restriction of visible air contaminants contained in Section 16 on three or more occasions in any six month period.

SAN FRANCISCO BAY AREA, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
REGULATION 2
(revised 1962)

Division 5, Chapter 1

Sec. 5111.1 No person shall cause, let, permit, suffer, or allow any emission from any heat transfer operation which does not comply with the visible emission limitations in Section 3110, Chapter 1, Division 3, except as provided in Section 5111.3.

Sec. 5111.2 No person shall cause, let, permit, suffer, or allow the emission from any heat transfer operation of particles in sufficient number to cause annoyance of any other person, which particles are sufficiently large as to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles. This section 5111.2 shall only apply if such particles fall on real property other than that of the person responsible for the emission.

Sec. 5111.3 The limitations of Section 5111.1 shall not apply to emissions resulting from soot-blowing on any oil-fired heat transfer operation, provided such emissions are not equal to or greater than Ringelmann No. 3 or an equivalent obscuration within the meaning of Sections 3110.1 and 3110.2; and provided further that the aggregate duration of such emissions during any twenty-four hour period does not exceed 6.0 minutes per billion Btu gross heating value of oil fuel burned during such twenty-four hours; and provided further that such operation uses fuel at a rate not less than 140 million Btu per hour.

Sec. 5112 PARTICULATE MATTER. No person shall cause, let, permit, suffer, or allow any emission from a heat transfer operation of particulate matter in excess of 0.30 grains per standard dry cubic foot of exhaust gas. For the purposes of this section 5112, the actual concentration measured shall be corrected to a concentration which the same quantity of particulate matter would constitute in the exhaust gas minus water vapor, corrected to standard conditions and containing 6% oxygen by volume. Calculation of this corrected concentration from the actual measured concentration shall follow the procedure given in Chapter 1, Division 8. Tests to determine compliance with this section 5112 shall be for not less than 50 minutes in any consecutive 60 minutes, or 90% of the time of actual source operation, whichever is less.

STATE OF ILLINOIS
AIR POLLUTION CONTROL BOARD
RULES AND REGULATIONS
(approved March 30, 1967)

Section 3

Emission Standards for New Equipment

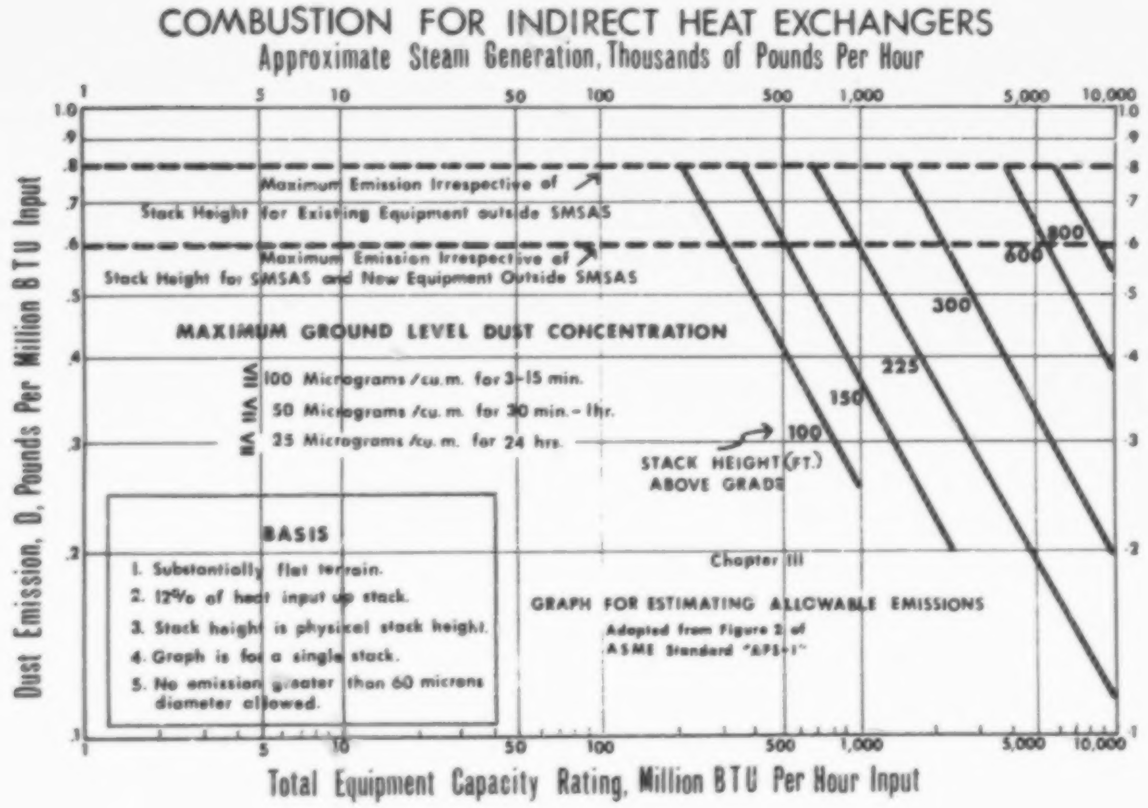
3-3.000 The emission standards set forth in this section shall be applicable to all new equipment capable of emitting one or more air contaminants to the atmosphere. These standards should be understood to be operating or performance standards, not design standards.

3-3.100 Specific Contaminants

3-3.110 Particulate Matter

3-3.112 Limitations for Combustion for Indirect Heating

Emissions of particulate matter from the combustion of fuel for indirect heating for new equipment shall be limited by the ASME Standard No. APS-1 dated June 15, 1966, "Recommended Guide for the Control of Dust Emission-Combustion for Indirect Heat Exchangers". For purposes of this Rule, the allowable emission shall be calculated from equation (15) in the standard with $Co_{max}2 = 50$. Figure 2 in the standard may be used to estimate allowable emissions. However, irrespective of stack height, the maximum allowable emission for any stack shall be 0.6 pound of particulates per million BTU input.



3-3.200 Specific Processes

It is suggested that all processes included in this section have provision in the design of the physical facility to allow alteration, addition or modification of the control equipment to reduce emissions from the process beyond the limitations prescribed herein in the event that the Board should require such action to fulfill its responsibilities pursuant to the Illinois Air Pollution Control Act. It is suggested that the emission limits of Rules 3-3.111, 3-3.112 and 3-3.122 be used as operational guides in making these design provisions.

Whenever the Board shall determine that any one or more of the operations covered under Rule 3-3.200 to Rule 3-3.2511 inclusive is causing or will cause air pollution in a specific area of the State, the Board may suspend any one or more of said Rules and may require emissions to be limited in accordance with Rule 3-3.100.

3-3.210 Iron and Steel

3-3.2110 Blast Furnaces

3-3.2111 The provisions of Rules 3-3.111 and 3-3.122 shall not apply to blast furnaces.

3-3.2112 All new blast furnaces shall be equipped with gas cleaning devices and so operated as to reduce the particulate matter in gases discharged to the atmosphere after burning to contain no more than 0.05 grains of particulate matter per standard cubic foot.

3-3.2113 Excess blast furnace gases being bled to the atmosphere shall contain no more than 0.10 grains of particulate matter per standard cubic foot and gases shall be burned as bled to the atmosphere.

3-3.2114 The provisions of Rule 3-3.2112 shall not apply during irregular movements of the furnace burden when it is necessary to open relief valves at the top of the furnace for safe operation.

3-3.2120 By Product Coke Plants

3-3.2121 The provisions of Rules 3-3.111 and 3-3.122 apply to new by-product coke plants, except as follows: (a) when charging a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than 20 minutes in any 60-minute period; (b) when pushing coke from a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than 20 minutes in any observed 60-minute period.

3-3.2122 Coke oven doors, frames and ovens shall be so maintained that smoke or fumes darker than No. 2 of the Ringelmann Chart will not escape to the atmosphere.

3-3.2130 Sintering Plants, Open Hearth Furnaces, Electric Furnaces and Basic Oxygen Furnaces

3-3.2131 The provisions of Rules 3-3.111 and 3-3.122 shall not apply to new plants, open hearth furnaces, electric furnaces and basic oxygen furnaces.

3-3.2132 All new sintering plants open hearth furnaces, electric furnaces, and basic oxygen furnaces shall be equipped with gas cleaning devices as necessary to reduce the particulate matter in the gas discharged to the atmosphere so that it does not exceed 0.10 grains per standard cubic foot of exhaust gas.

3-3.2133 The provisions of Rule 3-3.2132 shall not apply to electric furnaces and basic oxygen furnaces when the gas collection system must be disconnected from the furnace as in charging and pouring.

3-3.2140 Heating and Reheating Furnaces
The provisions of Rule 3-3.122 shall apply to all new heating and reheating furnaces.

3-3.220 Cement Kilns

3-3.221 The provisions of Rule 3-3.111 shall not apply to cement kilns.

3-3.222 All new cement kilns shall be equipped with gas cleaning devices to reduce the particulate matter in the gas discharged to the atmosphere to 99.7% of the particulate matter entering the gas cleaning device. However, particulate matter discharged to the atmosphere shall not exceed 0.1 grain per standard cubic foot regardless of the degree of efficiency required by the gas cleaning device.

FEDERAL FACILITIES

CFR, TITLE 42, SECTION 76.4

(by Executive Order 11282, May 26, 1966)

Section 76.4 Combustion of fuel

(a) The following standards apply to the combustion units of facilities and buildings having a heat input of less than 1,000 million Btu/hour, other than fireplaces, stoves, or grills burning wood or charcoal:

(1) Manually fired equipment shall not be installed as new or replacement equipment, except for the burning of anthracite, coke, or smokeless fuel.

(2) (i) For new units, except during startup, cleaning of fires, or soot blowing, the density of any emission to the atmosphere shall not exceed No. 1 on the Ringelmann Scale or the Smoke Inspection Guide.

(ii) For existing units, except during startup, cleaning of fires, or soot blowing, the density of any emission to the atmosphere shall not exceed No. 2 on the Ringelmann Scale or Smoke Inspection Guide.

(3) A photoelectric or other type smoke detector, recorder, or alarm shall be installed on units larger than ten million Btu per hour input, except where gas or light oil (No. 2 or lighter), is burned.

(4) During routine operation, the emission of particles larger than 60 microns shall not normally occur.

(5) Means shall be provided in all newly constructed units and wherever practicable in existing units to allow the periodic measurement of fly ash and other particulate matter.

(6) All new or replacement spreader stoker installations shall be of a type that automatically discharges ashes to the ash pit either continuously or in very frequent small increments, and fly ash shall be reinjected only from boiler passes.

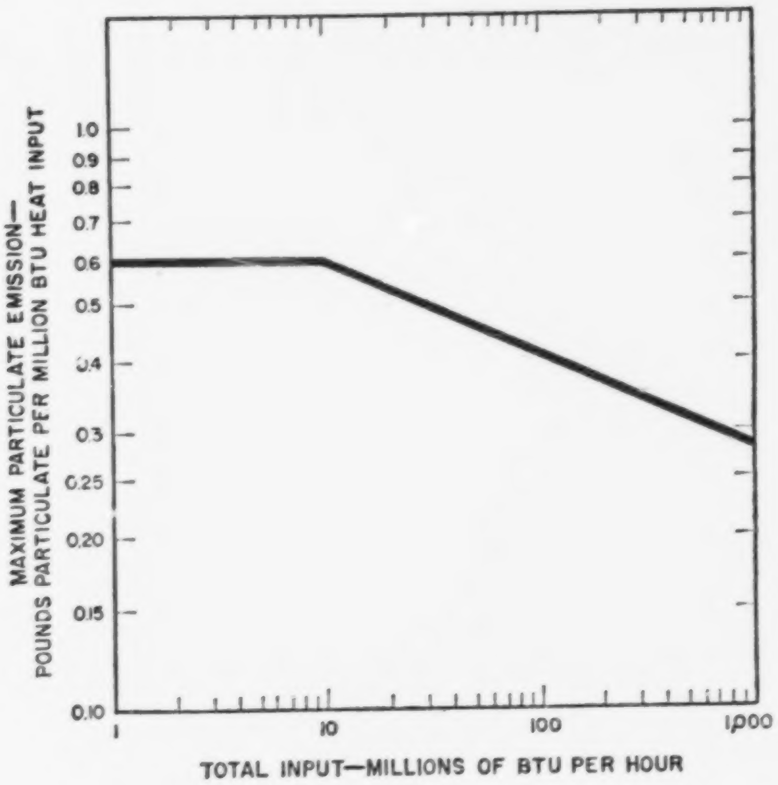
(7) For units of less than 10 million Btu/hour heat input, the emission of fly ash and other particulate matter shall not exceed 0.6 pounds of particulate matter per million Btu heat input as measured by the American Society of Mechanical Engineers Power Test Code No. 27 for "Determining Dust Concentrations in a Gas Stream," or equivalent test method.

(8) For units between 10 million and 1,000 million Btu/hour heat input, the emission of fly ash and other particulate matter shall not exceed that specified in figure 1, as measured by the test method specified in subparagraph (7) of this paragraph. Existing units shall meet this standard within the time designated by the plan submitted in accordance with section 3 of the Executive order except that with respect to existing spreader stoker units the plant may specify certain units which may emit particulate matter at an interim rate not exceeding 0.6 lbs/million Btu heat input.

(b) For units having a heat input of more than 1,000 million Btu/hour, the appropriate department, agency, or establishment shall seek special advice from the Secretary with regard to smoke, fly ash, and other particulate emissions.

FIGURE I

MAXIMUM EMISSION OF PARTICULATE MATTER FROM FUEL BURNING INSTALLATIONS



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PARTICULATE EMISSIONS FROM REFUSE-BURNING EQUIPMENT*

ALLEGHENY COUNTY, PENNSYLVANIA
SMOKE CONTROL ORDINANCE
(effective July 5, 1960)

309.3 INCINERATORS OF ALL TYPES:

(a) Incinerators shall completely consume not less than 95 percent of all combustible material charged into them, except that domestic gas-fired incinerators shall meet the standards given in the American Standards Association publication Z-21.6-1957, or latest revision thereof.

(b) Smoke emitted into the atmosphere from any incinerator shall be of an appearance, density, or shade lighter than No. 1 of the Ringelmann Chart.

(c) No person shall cause, suffer, or allow to be emitted into the atmosphere from any incinerator or pass a convenient measuring point near the stack outlet, fly ash in the gases to exceed 0.20 lb per 1,000 lb of gases.

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*Additional types of regulations are listed in the zoning ordinances of Beloit, Wisconsin, Evansville and Porter County, Indiana, and Cook and DuPage Counties in Illinois, in the "Zoning Ordinances" section of this compliation.

CITY OF CINCINNATI, OHIO
AIR POLLUTION CONTROL
ORDINANCE NO. 119-1965
(passed March 24, 1965)

Division J. INCINERATORS

Sec. 2509-8. INCINERATOR MAINTENANCE AND OPERATION.

It shall be unlawful for any person to permit or cause foul or offensive odors, fumes, gases, fly ash or smoke in the maintenance or operation of an incinerator.

Odors shall be considered offensive when any odor similar to that of burning paper, garbage, or other cellulose material is emitted from the incinerator chimney and is detectable at a distance of more than 25 feet from the incinerator chimney or at a location of a citizen complaint whichever is a greater distance.

Exception: One period of not to exceed ten (10) minutes in any consecutive 24 hour period will be permitted for the purpose of bringing the incinerator up to the required discharge gas temperature.

Fly ash shall be considered offensive when the particulate matter in the combustion gases discharged from the chimney or at any convenient measuring point in the chimney or in the chimney connection from the incinerator to the chimney exceeds either criteria A or criteria B of this section.

Criteria A: 0.4 pounds of particulate matter per 1000 pounds of discharged gases adjusted to 12 percent CO_2.

Criteria B: A discharge from the incinerator chimney of 500,000 particles per minute for incinerators located in residence districts; 750,000 particles per minute for incinerators located in business districts; and 1,000,000 particles per minute for incinerators located in industrial districts.

The method of determining criteria A shall be by approved stack testing procedure.

The method of determining criteria B, the number of particles discharged from the incinerator chimney, shall be the "adhesive surface method" and the procedure shall be as follows: Two-inch white strips of approved adhesive material shall be wrapped around a suitable holder approximately 2-3/4 inch in diameter and inserted in the discharge gases at the chimney exit point or at any convenient measuring point in the chimney or breeching. The exposure of the adhesive surface to the discharge gases shall be for one minute or less. After exposure, the adhesive surface shall be removed to the laboratory. Approximately one square inch of adhesive surface having the greatest particle deposit shall be counted by approved microscope counting techniques using magnification of 14X and the average count of 10 random fields. "Particle caught per square inch of adhesive surface per minute of exposure time" are thus determined. "Particles per minute discharged per test" are determined by multiplying the "particles caught per square inch of adhesive surface per minute" times square inches of the chimney or breeching at the sampling point.

For purposes of criteria B, the number of particles discharged shall be the average of three consecutive tests taken not less than five minutes nor more than ten minutes separated in time from each other. The choice as to which set of three consecutive tests are used shall be at the discretion of the Air Pollution Control and Heating Engineer, and are intended to represent a period of high particulate matter discharge from the chimney.

CITY OF DETROIT, MICHIGAN
OFFICIAL AIR POLLUTION CONTROL CODE
ORDINANCE NO. 167-E
ARTICLE 2
(effective November 6, 1964)

EMISSION SCHEDULE

Source of Emission Incinerators (e)		Maximum Allowable Emission pounds particulate per thousand pounds of exhaust [a] [g]	
Use	Rating #/hr.	Design[b]	Operating[b]
Residential Apartments	0 to 200	-	0.65
Residential Apartments	200 and over	-	0.30
Commercial & Industrial	0 to 400	-	0.65
Commercial & Industrial	400 and over	-	0.30
Municipal		-	0.30

(a) Fuel burning and incinerator emission limitations shall be corrected to 150 percent total air.

(b) The operating limitation allows for gradual deterioration of equipment performance during extended periods of continuous operation where it is impractical to maintain design conditions for these extended periods. (See Regulation No. 1, Section 2.4 for further details on intent.)

(e) These emission limitations do not apply to domestic incinerators (defined as having not over 5 cubic feet of storage capacity) which are covered by other sections of the ordinance.

(g) When wet collectors or scrubbers are utilized, that portion of water vapor in the exhaust gases which was added for collector or scrubber requirements shall be deleted from the total exhaust gases in calculating the particulate emission rate.

The State of Michigan and Wayne County, Michigan, also use this standard.

CITY OF NEW YORK, NEW YORK
AIR POLLUTION CONTROL CODE
ARTICLE 9. EMISSION STANDARDS
(effective October 1, 1964)

Sec. 9.09 EMISSION OF PARTICULATE MATTER FROM REFUSE BURNING EQUIPMENT, FUEL BURNING EQUIPMENT, OR EQUIPMENT USED IN A MANUFACTURING PROCESS: WEIGHT-RATE STANDARD.

No person shall cause or permit the emission of particulate matter from refuse burning equipment, fuel burning equipment, or equipment used in a manufacturing process if the emission from such equipment is in violation of the provisions of Section 9.03 or if the particulate matter emitted as measured in the flue exceeds the following weights:

(a) In refuse burning equipment, 0.65 pounds, for each thousand pounds of dry gases, adjusted to 50 percent excess air or calculated to 13 percent carbon dioxide, but in no event shall more than 250 pounds of particulate matter be emitted in any 60-minute period;

(b) (Does not pertain to this section. Listed under "Regulations Pertaining to Emissions from Fuel Burning Plants" section of this report.)

(c) (Does not pertain to this section. Listed under "Regulations Pertaining to Emissions from Manufacturing Processes" section of this report.)

Local Law No. 14
(effective May 20, 1966)

893-3.0. Refuse Disposal; new installation.

(a) Commencing two years after the effective date of this section no person shall cause or permit the installation or construction of refuse burning equipment for the burning of garbage or other waste matter. This provision shall not apply to refuse burning equipment operated by the department of sanitation.

(b) A system of hygienic control or hygienic disposal of putrescible garbage and equipment capable of reducing the volume of refuse by two-thirds, by means other than burning, constructed, maintained and operated in conformity with the applicable provisions of the administrative code and the regulations of the board and the department of buildings, shall be provided in the following types of multiple dwellings:

1. All multiple dwellings which are four or more stories in height and occupied by more than twelve families, and which are erected after two years after the effective date of this section; and

2. All "class B" multiple dwellings as defined by the multiple dwelling law, and which are erected after two years after the effective date of this section.

(c) Mechanically operated garbage grinders for the discharge of solid kitchen waste materials from dwelling units may be installed in all dwellings or multiple dwellings erected two years after the effective date of this section, provided:

1. That any such grinder shall discharge wastes at a reasonably uniform rate, in fluid form which shall flow readily and in a manner which will prevent clogging or stoppage of the drain line or sanitary sewer; and

2. that any such grinder shall be designed and installed in accordance with such design or manner of installation as may be approved by the board of standards and appeals; and

3. that installation of any such grinder shall comply with all applicable provisions of the building code and electrical code.

893-4.0 Refuse Disposal; municipal incinerators.

(a) No incinerator operated or to be operated by the City of New York or any governmental department thereof shall be constructed or substantially reconstructed unless there shall be installed and operated therein control apparatus which incorporates the most effective advances in the art of air pollution control as determined by the commissioner.

(b) Commencing three years after the effective date of this section no incinerator shall be operated by the City of New York or any governmental department thereof unless there shall be installed and operated therein control apparatus which incorporates the most effective advances in the art of air pollution control as determined by the commissioner.

1. On or about September 1, 1966, and annually thereafter until such time as the installations required by subsection (b) of this section have been completed, the department of sanitation shall report to the council indicating the status of the improvement program required by subsection (b) of this section.

SAN FRANCISCO BAY AREA, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
REGULATION 2
(revised 1962)

Division 4, Chapter 1

Section 4111.1 No person shall cause, let, permit, suffer, or allow any emission from any incineration operation or salvage operation which does not comply with the visible emission limitations in Section 3110, Chapter 1, Division 3.

Section 4111.2 No person shall cause, let, permit, suffer, or allow the emission from any incineration operation or salvage operation of particles in sufficient number to cause annoyance to any other person, which particles are sufficiently large as to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles. This Section 4111.2 shall only apply if such particles fall on real property other than that of the person responsible for the emission.

Section 4112.1 No person shall cause, let, permit, suffer, or allow any emission from any incineration operation of particulate matter in excess of a concentration of 0.20 grains per standard dry cubic foot of exhaust gas. For the purposes of this section 4112.1, the actual measured concentration of particulate matter in the exhaust gas shall be corrected to the concentration which the same quantity of particulate matter would constitute in the exhaust gas, minus water vapor, corrected to standard conditions, containing 6% oxygen by volume and as if no auxiliary fuel had been used. Calculation of this corrected concentration from the actual measured concentration shall be as given in Chapter 1, Division 8. Tests for determining compliance with this section 4112.1 shall be for not less than 50 minutes in 60 consecutive minutes, or 90% of the time of actual source operation, whichever is less (amended by Resolution No. 258, dated October 18, 1961).

Section 4113 HYDROCARBONS AND CARBONYLS. No person shall cause, let, permit, suffer, or allow the emission from any incineration operation or salvage operation of an exhaust gas containing a concentration of more than 50 ppm (vol) of total hydrocarbons, or a concentration of more than 50 ppm (vol) of total carbonyls. For purposes of this section 4113, the actual measured concentrations of hydrocarbons and carbonyls in the exhaust gas shall be corrected to concentrations which the same quantities of hydrocarbons and carbonyls would constitute in the exhaust gas minus water vapor, corrected to standard conditions, containing 6% oxygen by volume, and as if no auxiliary fuel had been used. Calculation of this corrected concentration shall be as given in Chapter 1, Division 8. For the purposes of this section 4113, total hydrocarbons shall be the sum of the concentrations in ppm (vol) of the individual concentrations of C_2 and higher saturated and unsaturated hydrocarbons, as measured by gas chromatography as described in Chapter 4, Division 9. Total carbonyls shall include aldehydes and ketones determined as described in Chapter 5, Division 9, and calculated as formaldehyde, each carbonyl group being deemed equivalent to one molecule of formaldehyde. Tests for determining compliance with this section 4113 shall be for not less than 15 consecutive minutes or 90% of the time of actual source operation, whichever is less.

RULES AND REGULATIONS
OF THE
POLLUTION CONTROL DISTRICT OF ORANGE COUNTY (CALIF.)

(approved October 25, 1955)

RULE 26. INCINERATOR BURNING.

After November 1, 1955, no person shall burn combustible refuse within the District in any device other than a Multiple Chamber Incinerator when the conditions hereinafter enumerated are determined and proclaimed by the Control Officer to exist.

(a) The inversion base at 7:00 a.m. Pacific Standard Time will be lower than one thousand five hundred feet, and

(b) Such inversion will not break or the maximum mixing height will not raise above three thousand five hundred feet, and

(c) The average surface wind speeds between 6:00 a.m. and 12:00 noon Pacific Standard Time will not exceed five miles per hour.

Under all other weather conditions the use of incinerators other than Multiple Chamber Incinerators shall be restricted to the hours between 6:00 a.m. and 10:00 a.m. and between 5:00 p.m. and 8:00 p.m. or at such other hours as established by proclamation of the Board.

ILLINOIS STATE AIR POLLUTION CONTROL BOARD
RULES AND REGULATIONS
(as of March 30, 1967)

3-3.230 Incinerators

3-3.231 The provisions of Rule 3-3.111 and Rule 3-3.122 shall not apply to new incinerators.

3-3.232 All new incinerators shall be equipped with gas cleaning devices as necessary to meet the following emission standards.

Particulate Matter:

(a) New incinerators with a rated refuse burning capacity of 1000 or more pounds per hour, shall not emit more than 0.2 grain of particulate matter per standard cubic foot of exhaust gas adjusted to 50% excess air.

(b) All other new incinerators shall not emit more than 0.35 grain of particulate matter per standard cubic foot of exhaust gas adjusted to 50% excess air.

Smoke:

No new incinerator shall emit or produce smoke the appearance, density or shade of which is No. 2 or darker on the Ringelmann Chart except that during an operational breakdown or while cleaning air pollution control equipment smoke may be emitted of an appearance, or density of No. 2 or darker on the Ringelmann Chart for a period or periods aggregating not more than three (3) minutes in any observed sixty (60) minute period.

FEDERAL FACILITIES

CFR, TITLE 42, SECTION 76.8

(By Executive Order 11282, May 26, 1966)

Section 76.8 Disposal of refuse.

(a) Refuse shall not be burned in open fires in urban areas. In nonurban areas there shall not be burned in open fires, within a 24-hour period, more than 25 pounds of material at a single site nor more than 500 pounds of material at any number of sites within a 1-mile radius, except that these quantities may be exceeded when the open burning occurs at diverse sites such as are associated with railroad rights-of-way, interurban highways, irrigation canals, forests, agricultural operations, etc. Deteriorated or unused explosives, munitions, and certain hazardous materials may be burned in open fires, in accordance with recognized procedures. Refuse shall not be left in dumps without being covered with inert matter within a reasonably short time.

(b) Refuse shall be incinerated only in facilities specially designed for that purpose. Incinerators shall meet the emission visibility standards of Section 76.4 (a) (2) and (a) (3). In addition, for installations burning 200 pounds of refuse or more per hour, emissions shall not exceed 0.2 grain of particulate matter per standard cubic foot of dry flue gas corrected to 12 percent carbon dioxide (without the contribution of auxiliary fuel), and shall not normally include particles larger than 60 microns. For installations burning fewer than 200 pounds of refuse per hour, emissions shall not exceed 0.3 grain of particulate matter per standard cubic foot of dry flue gas corrected to 12 percent carbon dioxide (without the contribution of auxiliary fuel).

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PARTICULATE EMISSIONS FROM MANUFACTURING PROCESSES *

ALLEGHENY COUNTY, PENNSYLVANIA
SMOKE CONTROL ORDINANCE
(effective July 5, 1960)

1308. STEEL AND ALLIED INDUSTRIES:

.1 The provisions of this article shall apply to blast furnaces, by-product coke plants, beehive coke ovens, open hearth furnaces, electric furnaces, sintering plants, basic oxygen steel furnaces, Bessemer converters, cupolas, heating and reheating furnaces, and air furnaces.

.2 Blast Furnaces:

(a) The provisions of Section 1305.3 and 1305.4 shall not apply to blast furnaces.

(b) All blast furnaces shall be equipped with gas cleaning devices and so operated as to reduce the particulate matter in the gases discharged to the atmosphere after burning to 0.35 lb. or less per 1,000 lb. of gases.

(c) Excess blast furnace gas being bled to the atmosphere shall contain no more than 0.50 lb. of particulate matter per 1,000 lb. of gases, and shall be burned as bled to the atmosphere.

(d) All iron blast furnaces shall be equipped with measuring devices which shall show a graphic record of the time and duration of all irregular movements of the burden, and of the time and duration of all openings of the blast furnace automatic relief valves, and such information shall be furnished to the Department as requested.

(e) The provisions of Sections 1308.2 (b) and 1308.2 (c) shall not apply during irregular movements of the furnace burden when it is necessary to open the automatic relief valves at the top of the furnace for safe operation.

(f) All persons responsible for the operation of blast furnaces within the County shall participate in a program of research to determine practical methods of further controlling the emission of air pollutants during irregular movements of the furnace burden. Reports indicating the progress of the research program shall be submitted annually by the Advisory Committee with recommendations to the Board of Health.

.3 By-Product Coke Plants:

(a) The provisions of Section 1305.3 shall apply to by-product coke ovens except as follows:

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*Additional types of regulations are listed in the zoning ordinances of Evansville and Porter County, Indiana, and Cook and DuPage Counties, Illinois, in the "Zoning Ordinances" section of this compilation.

1. When charging a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density, or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than twelve (12) minutes in any sixty (60) minute period.

2. When pushing coke from a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density, or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than twelve (12) minutes in any sixty (60) minute period.

(b) Coke oven doors, frames, and ovens shall be so maintained that smoke or fumes darker than No. 2 of the Ringelmann Chart will not escape to the atmosphere.

(c) All persons responsible for the operation of by-product coke plants shall participate in a program of research to determine practical methods of further controlling the emission of air pollutants from such plants. Reports indicating the progress of the research program shall be submitted annually by the Advisory Committee with recommendations to the Board of Health.

.4 Beehive Coke Ovens:

(a) No beehive coke ovens shall be operated within the County.

.5 Open Hearth Furnaces, Electric Furnaces, and Sintering Plants:

(a) The provisions of Sections 1305.3 and 1305.4 shall not apply to open hearth furnaces, electric furnaces, and sintering plants.

(b) All open hearth furnaces, electric furnaces, and sintering plants constructed subsequent to the enactment of these Rules and Regulations shall be equipped with gas cleaning devices to reduce the particulate matter in the gas discharged to the atmosphere to 0.20 lb. or less per 1,000 lb. of gases.

(c) For all open hearth furnace plants, electric furnace plants, and sintering plants respectively, which were constructed prior to the enactment of these Rules and Regulations, a program for the continued installation of gas cleaning devices, or, alternatively, a program for the replacement of specified plant facilities shall be recommended by the Advisory Committee to the Board of Health. The program shall be submitted within such time as shall be fixed by the Board of Health. In each program for gas cleaning, the devices shall reduce the particulate matter in the gas discharged to the atmosphere to 0.20 lb. or less per 1,000 lb. of gases. After said program has been approved by the Board of Health, the owner of said equipment shall not be in violation of these Rules and Regulations so long as said program is complied with. Reports indicating the status of these gas cleaning programs shall be submitted annually by the Advisory Committee to the Board of Health.

(d) The provisions of Sections 1308.5 (b) and 1308.5 (c) shall not apply to electric furnaces when the gas collection system is necessarily disconnected from the furnace, as in charging and pouring.

(e) All persons responsible for the operations of open hearth furnaces, electric furnaces, and sintering plants within the County shall undertake or participate in a program of research to determine practical methods of further controlling the emission of air pollutants from such furnaces. Reports indicating the progress of these research programs shall be submitted annually by the Advisory Committee with recommendations to the Board of Health.

.6 Basic Oxygen Steel Furnaces:

(a) The provisions of Sections 1305.3 and 1305.4 shall not apply to basic oxygen steel furnaces.

(b) All basic oxygen steel furnace plants shall be equipped with gas cleaning devices to reduce the particulate matter in the gases discharged to the atmosphere to 0.20 lb. or less per 1,000 lb. of gases.

.7 Bessemer Converters:

(a) No new Bessemer converter shall be constructed within the County until equipment effecting air pollution control in accordance with the provisions of Section 1305.4 shall have been developed.

(b) The provisions of Sections 1305.3 and 1305.4 shall not apply to Bessemer converters in existence at the time of the enactment of these Rules and Regulations.

(c) All persons responsible for the operation of Bessemer converters shall undertake or participate in a program of research to determine practical methods of controlling the emission of air pollutants from such Bessemer converters. Reports indicating the progress of the research program shall be submitted annually with recommendations by the Advisory Committee to the Board of Health.

.8 Cupolas:

(a) All new cupolas constructed within the County shall be equipped with gas cleaning devices and so operated as to comply with the provisions of Section 1305.3 and to reduce the particulate matter in the gases discharged to the atmosphere to 0.50 lb. or less per 1,000 lb. of gases.

(b) The provisions of Sections 1305.3 and 1305.4 shall not apply to cupolas in existence at the time of the enactment of these Rules and Regulations.

(c) All persons responsible for the operation of cupolas within the County shall undertake to participate in a program of research to determine practical methods of further controlling the emission of air pollutants from cupolas. Reports indicating the status of the research shall be submitted annually by the Advisory Committee with recommendations to the Board of Health.

.9 Heating and Reheating Furnaces:

(a) The following exception to the provisions of Section 1305.3 shall be permitted in connection with the operation of a heating or reheating furnace: smoke shall be permitted of an appearance, density, or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than six (6) minutes in any sixty (60) minute period.

(b) No person shall cause, suffer, or allow to be emitted into the open air from any heating or reheating furnace, or to pass a convenient measuring point nearest the stack outlet, particulate matter in the gases to exceed 0.30 lb per 1,000 lb of gases.

.10 Air Furnaces:

(a) The following exception to the provisions of Section 1305.3 shall be permitted in connection with the operation of an air furnace: smoke shall be permitted of an appearance, density, or shade darker than No. 2 of the Ringelmann Chart for a period of periods aggregating not more than six (6) minutes in any sixty (60) minute period.

(b) No person shall cause, suffer, or allow to be emitted into the open air from any air furnace, particulate matter in the gases to exceed 0.50 lb per 1,000 lb of gases.

STATE OF ILLINOIS
AIR POLLUTION CONTROL BOARD
RULES AND REGULATIONS
(approved March 30, 1967)

3-3.200 Specific Processes

It is suggested that all processes included in this section have provision in the design of the physical facility to allow alteration, addition or modification of the control equipment to reduce emissions from the process beyond the limitations prescribed herein in the event that the Board should require such action to fulfill its responsibilities pursuant to the Illinois Air Pollution Control Act. It is suggested that the emission limits of Rules 3-3.111, 3-3.112 and 3-3.122 be used as operational guides in making these design provisions.

Whenever the Board shall determine that any one or more of the operations covered under Rule 3-3.200 to Rule 3-3.2511 inclusive is causing or will cause air pollution in a specific area of the State, the Board may suspend any one or more of the said Rules and may require emissions to be limited in accordance with Rule 3-3.100.

3-3.210 Iron and Steel

3-3.2110 Blast Furnaces

3-3.2111 The provisions of Rules 3-3.111 and 3-3.122 shall not apply to blast furnaces.

3-3.2112 All new blast furnaces shall be equipped with gas cleaning devices and so operated as to reduce the particulate matter in gases discharged to the atmosphere after burning to contain no more than 0.05 grains of particulate matter per standard cubic foot.

3-3.2113 Excess blast furnace gases being bled to the atmosphere shall contain no more than 0.10 grains of particulate matter per standard cubic foot and gases shall be burned as bled to the atmosphere.

3-3.2114 The provisions of Rule 3-3.2112 shall not apply during irregular movements of the furnace burden when it is necessary to open relief valves at the top of the furnace for safe operation.

3-3.2120 By-Product Coke Plants

3-3.2121 The provisions of Rules 3-3.111 and 3-3.122 apply to new by-product coke plants, except as follows: (a) when charging a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than 20 minutes in any 60-minute period; (b) when pushing coke from a battery of coke ovens, smoke shall be permitted from such battery of an appearance, density or shade darker than No. 2 of the Ringelmann Chart for a period or periods aggregating not more than 20 minutes in any observed 60-minute period.

3-3.2122 Coke oven doors, frames and ovens shall be so maintained that smoke or fumes darker than No. 2 of the Ringelmann Chart will not escape to the atmosphere.

3-3.2130 Sintering Plants, Open Hearth Furnaces, Electric Furnaces and Basic Oxygen Furnaces

3-3.2131 The provisions of Rules 3-3.111 and 3-3.122 shall not apply to new sintering plants, open hearth furnaces, electric furnaces and basic oxygen furnaces.

3-3.2132 All new sintering plants, open hearth furnaces, electric furnaces, and basic oxygen furnaces shall be equipped with gas cleaning devices as necessary to reduce the particulate matter in the gas discharged to the atmosphere so that it does not exceed 0.10 grains per standard cubic foot of exhaust gas.

3-3.2133 The provisions of Rule 3-3.2132 shall not apply to electric furnaces and basic oxygen furnaces when the gas collection system must be disconnected from the furnace as in charging and pouring.

3-3.2140 Heating and Reheating Furnaces

The provisions of Rule 3-3.122 shall apply to all new heating and reheating furnaces.

3-3.220 Cement Kilns

3-3.221 The provisions of Rule 3-3.111 shall not apply to cement kilns.

3-3.222 All new cement kilns shall be equipped with gas cleaning devices to reduce the particulate matter in the gas discharged to the atmosphere to 99.7% of the particulate matter entering the gas cleaning device. However, particulate matter discharged to the atmosphere shall not exceed 0.1 grain per standard cubic foot regardless of the degree of efficiency required by the gas cleaning device.

CITY OF DETROIT, MICHIGAN
OFFICIAL AIR POLLUTION CONTROL CODE
ORDINANCE NO. 167-E
ARTICLE 2
(effective November 6, 1964)

EMISSION SCHEDULE

Source of Emission	Maximum Allowable Emission pounds particulate per thousand pounds of exhaust gas (a), (g)	
	Design (b)	Operating (b)
Ferrous Cupola		
Production	0.10	0.25
Jobbing		0.40
Steel Manufacturing		
Open hearth Furnaces	0.10	0.20
Basic Oxygen Furnaces	0.10	0.20
Electric Furnaces (d)	0.10	0.20
Sintering Plants	0.15	0.20
Blast Furnaces		0.20
Blast Furnaces (excess gas bled to atmosphere)		0.50
Heating & Reheating Furnaces		0.30

(a) Fuel burning and incinerator emission limitations shall be corrected to 150 percent total air.

(b) The operating limitation allows for gradual deterioration of equipment performance during extended periods of continuous operation where it is impractical to maintain design conditions for these extended periods. (See Regulation No. 1, Section 2.4 for further details on intent.)

(d) These emission limitations shall not apply to electric furnaces when the gas collection system needs to be disconnected due to technical infeasibility, as may be encountered during charging, refining in a reducing slag, and pouring.

(g) When wet collectors or scrubbers are utilized, that portion of water vapor in the exhaust gases which was added for collector or scrubber requirements shall be deleted from the total exhaust gases in calculating the particulate emission rate.

Section 2.4A

REGULATION NO. 2
DIFFERENTIATION BETWEEN JOBBING AND PRODUCTION FOUNDRIES

Cupolas used in a jobbing foundry are the same as those used in a production foundry and will vary in size only according to the quantity of iron melted per hour.

However, the cupolas in a jobbing foundry will be run intermittently for just long enough at one time to pour the molds that are ready on the foundry floor, job by job. This might be for a 2 to 4 hour period per day for any number of days per week.

Whereas the production foundry cupolas will melt continuously to pour a succession of molds that are constantly being prepared to receive this continuous flow of iron. This could become 8 hours, 16 hours, or 24 hours per day for any number of days per week.

REGULATION NO. 3
COLLECTOR REQUIREMENTS FOR PRODUCTION CUPOLAS

The intent of the design emission limitation of 0.1#/1000# of gas applying to production ferrous foundry cupolas is to require the installation of high efficiency collectors capable of collecting the fine metallic fume typical of emissions from this source. Presently available equipment suitable for this application is a well designed baghouse or a high pressure drop Venturi scrubber of equivalent efficiency. Other types of collectors will be considered on their individual merit and upon submission of adequate proof that they are capable of achieving equal efficiencies.

The operating limit of 0.25#/1000# of gas is intended to provide only for short time unavoidable variations from design conditions and for gradual deterioration of equipment during normal continuous operation. Deliberate or intentional operation of equipment at less that its intended design efficiency is considered to be a violation of this Ordinance.

REGULATION NO. 4
COLLECTOR REQUIREMENTS FOR JOBBING SHOP CUPOLAS

This Regulation is for the purpose of clarifying the intent of the emission of limitation of 0.4#/1000# of gas applying to jobbing shop cupolas.

High efficiency cyclone type collectors or other types of collectors not less efficient are considered acceptable and capable of meeting this requirement.

Should the operation of this equipment, when properly applied, operated and maintained and served by an adequate stack, meet all Ordinance requirements except the applicable emission limitation, this limitation is to be re-evaluated.

COUNTY OF LOS ANGELES, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION IV. PROHIBITIONS
(amended June 1, 1965)

Rule 54. DUST AND FUMES. A person shall not discharge in any one hour from any source whatsoever dust or fumes in total quantities in excess of the amount shown in the following table: (see next page)

To use the following table, take the process weight per hour as such is defined in Rule 2(j)*. Then find this figure on the table, opposite which is the maximum number of pounds of contaminants which may be discharged into the atmosphere in any one hour. As an example, if A has a process which emits contaminants into the atmosphere and which process takes 3 hours to complete, he will divide the weight of all materials in the specific process, in this example, 1,500 lbs. by 3 giving a process weight per hour of 500 lbs. The table shows that A may not discharge more than 1.77 lbs. in any one hour during the process. Where the process weight per hour falls between figures in the left hand column, the exact weight of permitted discharge may be interpolated.

This standard is also used by the following jurisdictions:

Providence, Rhode Island
Orange County, California
Sacramento County, California
Florida (entire state)
Sarasota, Florida

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* Rule 2(j). Process Weight per Hour. "Process Weight" is the total weight of all materials introduced into any specific process which process may cause any discharge into the atmosphere. Solid fuels charged will be considered as part of the process weight, but liquid and gaseous fuels and combustion air will not. "The Process Weight per Hour" will be derived by dividing the total process weight by the number of hours in one complete operation from the beginning of any given process to the completion thereof, excluding any time during which the equipment is idle.

TABLE

Process Wt/hr(lbs)	Maximum Weight Disch/hr(lbs)	Process Wt/hr(lbs)	Maximum Weight Disch/hr(lbs)
50	.24	3400	5.44
100	.46	3500	5.52
150	.66		
200	.85	3600	5.61
250	1.03	3700	5.69
300	1.20	3800	5.77
350	1.35	3900	5.85
400	1.50	4000	5.93
450	1.63		
500	1.77	4100	6.01
		4200	6.08
550	1.89	4300	6.15
600	2.01	4400	6.22
650	2.12	4500	6.30
700	2.24		
750	2.34	4600	6.37
800	2.43	4700	6.45
850	2.53	4800	6.52
900	2.62	4900	6.60
950	2.72	5000	6.67
1000	2.80		
		5500	7.03
1100	2.97	6000	7.37
1200	3.12	6500	7.71
1300	3.26	7000	8.05
1400	3.40	7500	8.39
1500	3.54	8000	8.71
		8500	9.03
1600	3.66	9000	9.36
1700	3.79	9500	9.67
1800	3.91		
1900	4.03	10000	10.0
2000	4.14	11000	10.63
		12000	11.28
2100	4.24	13000	11.89
2200	4.34	14000	12.50
2300	4.44	15000	13.13
2400	4.55		
2500	4.64	16000	13.74
		17000	14.36
2600	4.74	18000	14.97
2700	4.84	19000	15.58
2800	4.92	20000	16.19
2900	5.02	30000	22.22
3000	5.10	40000	28.3
		50000	34.3
3100	5.18	60000	40.0
3200	5.27	or	
3300	5.36	more	

STATE OF NEW JERSEY
AIR POLLUTION CONTROL CODE
CHAPTER VII
(effective October 1, 1964)

Section 2. CONTROL AND PROHIBITION OF AIR POLLUTION FROM SOLID PARTICULATES

2.1 No person shall cause, suffer, allow or permit solid particles to be discharged from any stack or chimney into the outdoor atmosphere in excess of the allowable emission as provided herein.

2.2 Whenever the discharge from any stack or chimney includes coarse solid particles which consist of a single material, the allowable emission of coarse solid particles shall be the basic emission as determined from Section 2.15 modified by the effect factor for the material being discharged as determined from Section 2.4.

2.3 Whenever the discharge from any stack or chimney includes coarse solid particles which consist of two or more materials, the allowable emission of coarse solid particles for each material shall be the basic emission as determined from Section 2.15 modified by the effect factor for the respective material as determined from Section 2.4; and the allowable emission of coarse solid particles for the combined materials from such stack or chimney shall be either the sum of the allowable emission for the individual materials or the allowable emission computed for an effect factor of one (1), whichever is the lesser.

2.4 The effect factor for coarse solid particles is as follows:

Material	Effect Factor
(a) All materials not specifically listed hereunder.	1.0
(b) Elements and their compounds on the basis of the element contained therein.	
(none assigned)	
When a compound (material) contains two or more elements, the effect factor of the element having the lowest effect factor shall apply.	
(c) Specific materials.	
(none assigned)	

2.5 Whenever the discharge from any stack or chimney includes fine solid particles which consist of a single material, the allowable emission of fine solid particles shall be the basic emission determined from Section 2.16 modified by the effect factor for the material being discharged as determined from Section 2.7.

2.6 Whenever the discharge from any stack or chimney includes fine solid particles which consist of two or more materials, the allowable emission of fine solid particles for each material shall be the basic emission as determined from Section 2.16 modified by the effect factor for the respective material as determined from Section 2.7 and the allowable emission of fine solid particles for the combined materials from such stack or chimney shall be either the sum of the allowable emissions for the individual materials or the allowable emission computed for an effect factor of one (1), whichever is the lesser.

2.7 The effect factor for fine solid particles is as follows:

	Material	Effect Factor
(a)	All materials not specifically listed hereunder.	1.0
(b)	Elements and their compounds on the basis of the element contained therein.	
	Antimony	0.9
	Arsenic	0.9
	Barium	0.9
	Beryllium	0.003
	Cadmium	0.2
	Chromium	0.2
	Cobalt	0.9
	Copper	0.2
	Hafnium	0.9
	Lead	0.3
	Phosphorous	0.2
	Selenium	0.2
	Silver	0.1
	Tellurium	0.2
	Thallium	0.2
	Uranium (Solu)	0.1
	Uranium (Insol)	0.4
	Vanadium	0.2
	When a compound (material) contains two or more elements, the effect factor of the elements having the lowest effect factor shall apply.	
(c)	Specific materials	
	Alpha-naphthyl-thio urea	0.5
	Lead arsenate	0.3
	Lithium hydride	0.04

2.8 Whenever the person responsible for the discharge of solid particles believes that a specific compound of an element listed in either Section 2.4(b) or Section 2.7(b) does not contribute to air pollution to the degree represented by the assigned effect factor, he may submit data to the Department setting forth reasons and justification for a less restrictive effect factor for the specific compound in question. If the change is approved by the Department, the Department shall, upon approval of the Commission, assign a revised effect factor which shall be used for the purpose of this chapter.

2.9 Whenever solid particles from one source operation are discharged through two or more stacks or chimneys, the total quantity that may be discharged from any one stack or chimney shall not exceed the allowable emission permitted for that stack or chimney, nor shall the total quantity that may be discharged from all the stacks exceed the emission that would be permitted from the single stack or chimney having the greatest allowable emission.

2.10 In any process wherein solid fuel is burned without direct contact with process material, Chapter V shall govern the allowable emission from the burning of solid fuel and Chapter VII shall govern the allowable emission from the source operation.

2.11 The provisions of this chapter shall not apply to:

(a) Smoke as defined and regulated under Chapter IV of this Code.

(b) Combustion of solid fuel as defined and regulated under Chapter V of this Code.

(c) Incinerators designed and operated for the destruction of refuse.

2.12 Upon the request of the Department, any person discharging solid particles through a stack or chimney shall submit to the Department, on forms provided by the Department, information regarding height of such stack, distance from stack to nearest property line, nature of source operation and such other information as the Department may require relative to the emission of solid particles.

2.13 Whenever the person responsible for any stack or chimney believes that the effective stack height is greater than the stack height, he may calculate the plume rise and submit his data on forms provided by the Department. If the plume rise is approved by the Department, the effective stack height may be used in lieu of the stack height.

2.14 Any person responsible for the emission of solid particles through stack or chimney from source operations shall, upon request of the Department, provide in connection with such stack or chimney such sampling facilities and testing facilities, exclusive of instruments and sensing devices, as may be necessary for the Department to determine the nature and quantity of solid particles which are or may be discharged as the result of source operations. Such facilities may be either permanent or temporary, at the discretion of the person responsible for their provision, and shall conform to all applicable laws and regulations concerning safe construction or safe practice.

2.15 The basic and allowable emissions for coarse solid particles shall be computed as follows:

Step 1 Establish stack height or effective stack height if plume rise is approved.

Step 2 Determine the distance from the stack to the nearest property line.

Step 3 Divide result of Step 2 by result of Step 1, this is the distance from stack to nearest property line in stack heights. Locate this value on the scale along the left side of chart for Basic Emission for Coarse Solid Particles.

Step 4 Locate the line on the chart representing the stack height or effective stack height determined from Step 1; interpolate if necessary.

Step 5 Draw a horizontal line across chart from the value determined by Step 3 to the point where this line intersects the line determined by Step 4.

2.16 The basic and allowable emissions for fine solid particles shall be computed as follows:

Step 1 Establish stack height or effective stack height if plume rise is approved.

Step 2 Determine distance from the stack to nearest property line.

Step 3 Divide result of Step 2 by result of Step 1, this is the distance from stack to nearest property line in stack heights. Locate this value on the scale along the left side of chart for Basic Emission for Fine Solid Particles.

Step 4 Locate the line on the chart representing the stack height or effective stack height determined from Step 1; interpolate if necessary.

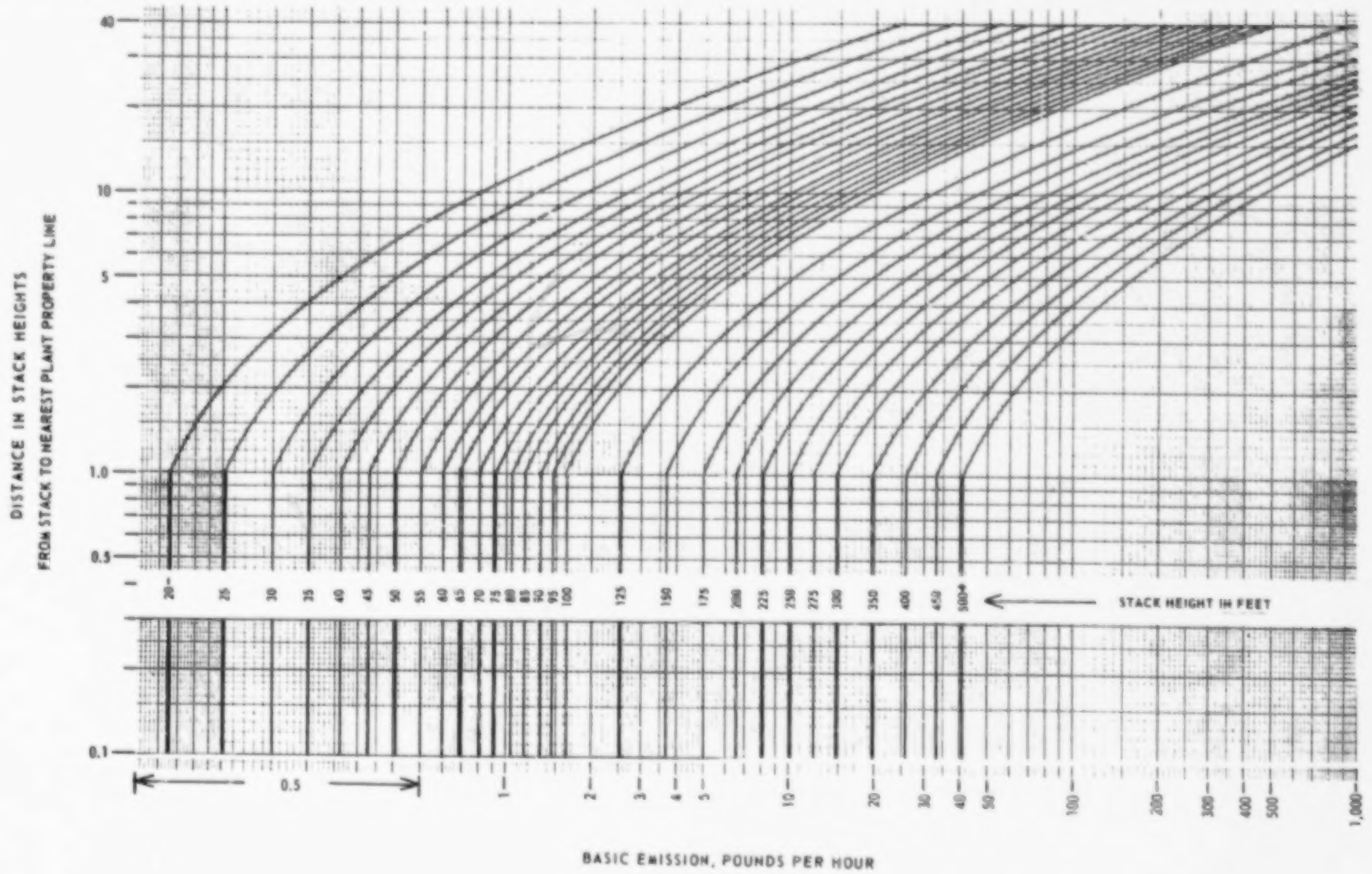
Step 5 Draw a horizontal line across chart from the value determined by Step 3 to the point where this line intersects the line determined by Step 4.

Step 6 Draw a vertical line from the point determined by Step 5 to the basic emission scale at the bottom of the chart. The point at which this line intersects the scale yields the basic emission in pounds per hour.

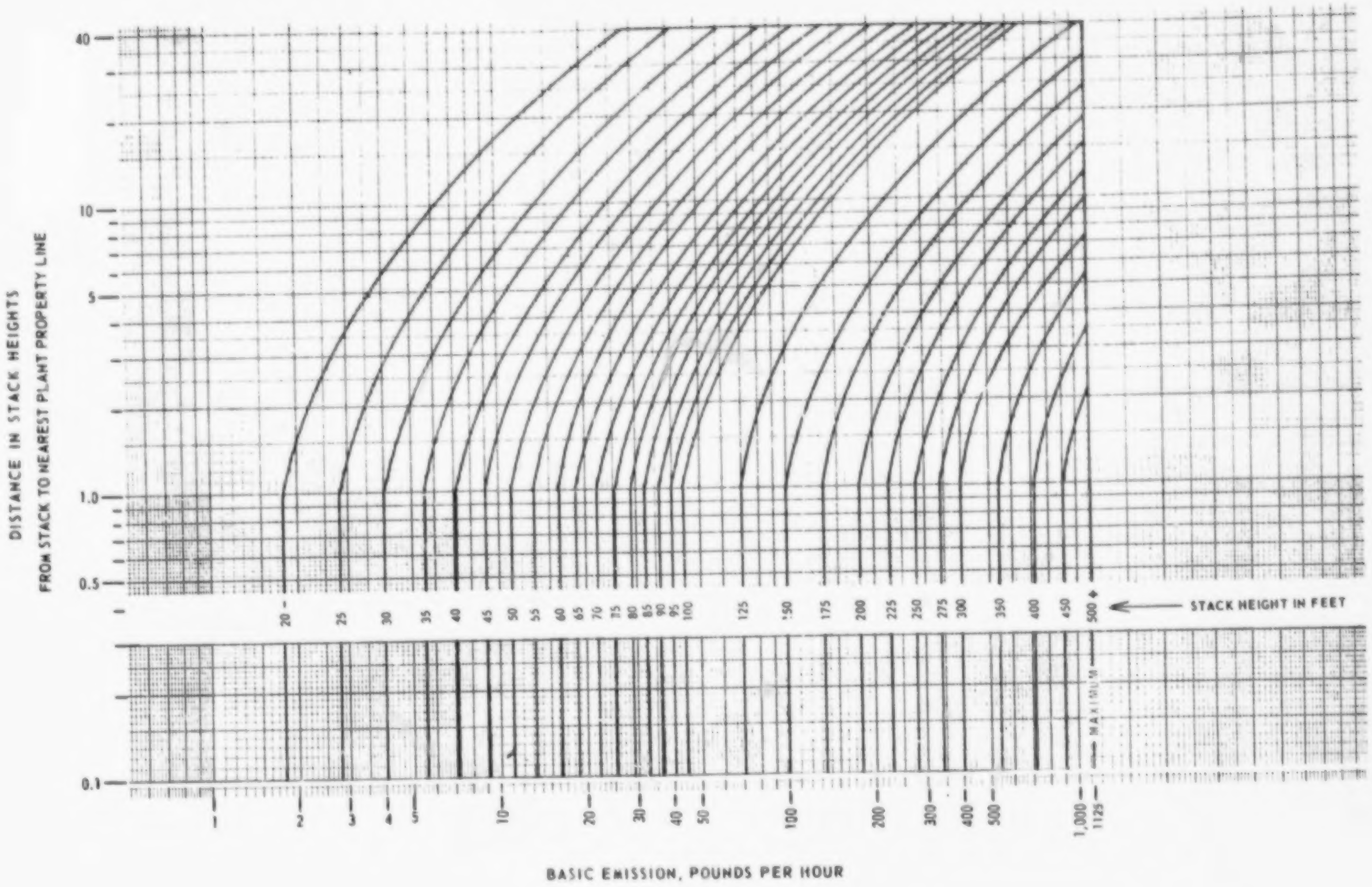
Step 7 Multiply the basic emission by the effect factor assigned under Section 2.7. The result yields the allowable emission for fine solid particles.

Note: Coarse solid particles are defined as solid particles having a size equal to or greater than 44 microns and solid particles when such particles are contained in or on liquid particles.

Fine solid particles are defined as solid particles, including fumes, having a size less than 44 microns.



N. J. AIR POLLUTION CONTROL CODE
Chapter VII, Section 2.15
BASIC EMISSION FOR COARSE SOLID PARTICLES
Chart No. 1



N. J. AIR POLLUTION CONTROL CODE
Chapter VII, Section 2.16
BASIC EMISSION FOR FINE SOLID PARTICLES
Chart No. 2

CITY OF NEW YORK, NEW YORK

AIR POLLUTION CONTROL CODE

ARTICLE 9. EMISSION STANDARDS

(effective October 1, 1964)

Section 9.09 EMISSION OF PARTICULATE MATTER FROM REFUSE BURNING EQUIPMENT, FUEL BURNING EQUIPMENT, OR EQUIPMENT USED IN A MANUFACTURING PROCESS: WEIGHT-RATE STANDARD

No person shall cause or permit the emission of particulate matter from refuse burning equipment, fuel burning equipment, or equipment used in a manufacturing process if the emission from such equipment is in violation of the provisions of Section 9.03 or if the particulate matter emitted as measured in the flue exceeds the following weights:

(a) (Does not pertain to this section. Listed under "Regulations Pertaining to Particulate Emissions from Refuse Burning Equipment Section of this report.)

(b) (Does not pertain to this section. Listed under "Regulations Pertaining to Particulate Emissions from Fuel Burning Plants" section of this report.)

(c) In equipment used in a manufacturing process, 0.5 pounds for each 100 pounds or less of process weight per hour. If the process weight per hour is more than 100 pounds, the amount of particulate matter which may be emitted in any 60 minute period shall decrease for each pound of process weight as the process weight per hour increases, as follows:

(1) no more than 1.46 pounds for each 500 pounds of process weight per hour;

(2) no more than 2.30 pounds for each 1,000 pounds of process weight per hour;

(3) no more than 6.70 pounds for each 5,000 pounds of process weight per hour;

(4) no more than 10.80 pounds for each 10,000 pounds of process weight per hour;

(5) no more than 20.00 pounds for each 25,000 pounds of process weight per hour;

(6) no more than 31.80 pounds for each 50,000 pounds of process weight per hour;

(7) no more than 43.00 pounds for each 75,000 pounds of process weight per hour;

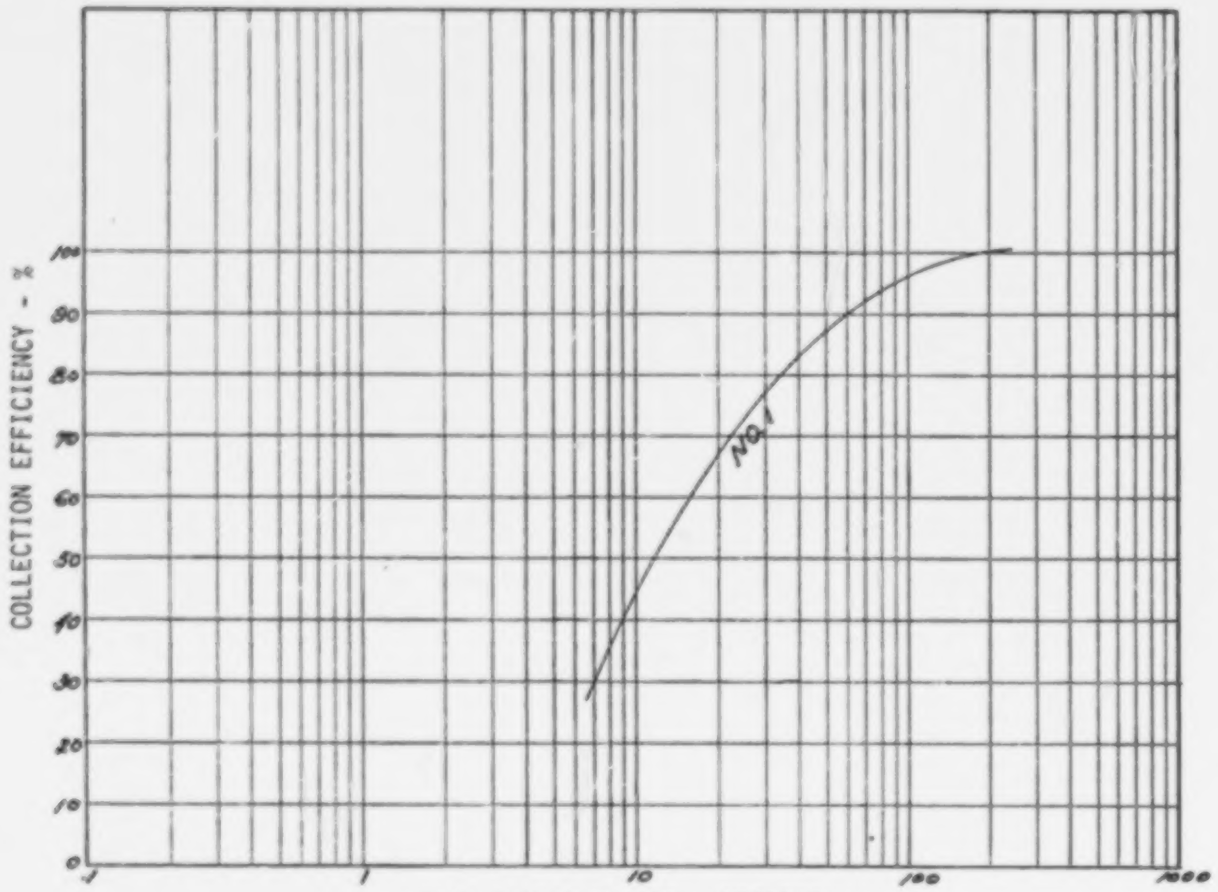
(8) no more than 50.00 pounds for each 100,000 pounds or more of process weight per hour except that if the equipment was installed before October 1, 1964, and the process weight per hour exceeds 100,000 pounds, then the amount of particulate matter which may be emitted in any 60 minute period shall be no more than 92.00 pounds for each 250,000 pounds of process weight per hour, no more than 145.00 pounds for each 500,000 pounds of process weight per hour, no more than 192.00 pounds for each 750,000 pounds of process weight per hour, and no more than 235.00 pounds for each 1,000,000 pounds or more of process weight per hour; but in no event shall more than 33 pounds be emitted in any 60 minute period

in light manufacturing districts as provided by the Zoning Resolution of the City of New York.

The amount of particulate matter which may be emitted for any intermediate amount of process weight per hour shall be determined by linear interpolation.

COUNTY OF SAN BERNARDINO, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION III
(adopted August 5, 1958)

Rule 3:6 (Amended 11-6-61) DUST, FUMES AND PARTICULATE MATTER. A person shall not discharge into the atmosphere in any one hour from any source, or single processing unit whatsoever, dust, fumes or particulate matter in quantities in excess of the limitations as shown by Curve No. 1 of Graph No. 3 of the Rules and Regulations adopted August 5, 1958. All such processes shall in addition to compliance with this Rule be controlled by Rules 3:2, 3:3, 3:4 and 3:5. It is hereby further declared to be the policy of the Control Board that this rule shall remain in effect for an indefinite period of time pending completion of a research project designed to obtain scientific data upon which to formulate a permanent, reasonable rule for control of non-toxic dust, fumes or particulate matter.



GRAPH III

SAN FRANCISCO BAY AREA, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
REGULATION 2
(revised 1962)

Division 6, Chapter 1

Section 6111.1 No person shall cause, let, permit, suffer or allow any emission from any general combustion operation or general operation which does not comply with the visible emission limitations in section 3110, Chapter 1, Division 3.

Section 6111.2 No person shall cause, let, permit, suffer, or allow the emission from any general combustion operation of particles in sufficient number to cause annoyance to any other person, which particles are sufficiently large as to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles. This section 6111.2 shall only apply if such particles fall on real property other than that of the person responsible for the emission.

Section 6112.1 No person shall cause, let, permit, suffer, or allow the emission from any general operation or general combustion operation of particulate matter from any emission point on a concentration in excess of 0.30 grain per standard dry cubic foot of exhaust gas volume.

Section 6112.2 Except as provided in sections 6112.3 and 6113 no person shall cause, let, permit, suffer, or allow the emission from any general operation or general combustion operation of particulate matter from any emission point at a rate in excess of that specified in Table 2 for the process weight rate allocated to such emission point.

Section 6112.3 The limitations established by section 6112.2 shall not require the reduction of particulate matter concentration, based on the source gas volume, below the concentration specified in Table 3 for such volume; provided that, for the purposes of this section 6112.3, the person responsible for the emission may elect to substitute a volume determined according to the provisions of section 6112.4; and provided further that the burden of showing the source gas volume or other volume substituted therefore, including all of the factors which determine such volume and the methods of determining and computing such volume, shall be on the person seeking to come within the provisions of this section 6112.3.

TABLE 2
ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE[a,b]

Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
Lb/Hr	Tons/Hr	Lb/Hr	Lb/Hr	Tons/Hr	Lb/Hr
100	0.05	0.551	16,000	8.00	16.5
200	0.10	0.877	18,000	9.00	17.9
400	0.20	1.40	20,000	10.	19.2
600	0.30	1.83	30,000	15.	25.2
800	0.40	2.22	40,000	20.	30.5
1,000	0.50	2.58	50,000	25.	35.4
1,500	0.75	3.38	60,000	30.	40.0
2,000	1.00	4.10	70,000	35.	41.3
2,500	1.25	4.76	80,000	40.	42.5
3,000	1.50	5.38	90,000	45.	43.6
3,500	1.75	5.96	100,000	50.	44.6
4,000	2.00	6.52	120,000	60.	46.3
5,000	2.50	7.58	140,000	70.	47.8
6,000	3.00	8.56	160,000	80.	49.0
7,000	3.50	9.49	200,000	100.	51.2
8,000	4.00	10.4	1,000,000	500.	69.0
9,000	4.50	11.2	2,000,000	1,000.	77.6
10,000	5.00	12.0	6,000,000	3,000	92.7
12,000	6.00	13.6			

[a] Sections of major importance with reference to this table are sections 2024, 2027, 3213, 3214, and 6112.2.

[b] Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation $E = 4.10P^{0.67}$, and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$E = 55.0P^{0.11} - 40$, where E = rate of emission in lb/hr and

P = process weight rate in tons/hr.

Section 6112.4 Any volume of gases passing through and leaving an air pollution abatement operation may be substituted for the source gas volume of the source operation served by such air pollution abatement operation, for the purposes of section 6112.3, provided such air pollution abatement operation emits no more than 40% of the weight of particulate matter entering thereto; and provided further that such substituted volume shall be corrected to standard conditions and to a moisture content no greater than that of any gas stream entering such air pollution abatement operation.

TABLE #3

MINIMUM CONCENTRATION TO BE REQUIRED[a,b]

Source Gas Volume, SCFM	Concentration GR/SCF	Source Gas Volume, SCFM	Concentration GR/SCF
7,000 or less	0.100	140,000	0.038
8,000	0.096	160,000	0.036
9,000	0.092	180,000	0.035
10,000	0.089	200,000	0.034
20,000	0.071	300,000	0.030
30,000	0.062	400,000	0.027
40,000	0.057	500,000	0.025
50,000	0.053	600,000	0.024
60,000	0.050	800,000	0.021
80,000	0.045	1,000,000 or more	0.020
100,000	0.042		
120,000	0.040		

[a] Sections of major importance with reference to this table are: Sections 2024, 2030, 6112.3, and 6112.4.

[b] Interpolation of the data in this table shall be based on linear interpolation between adjacent values.

CHAPTER 2.

Section 6200 Emissions from the following listed source operations shall be subject to this section 6200, to sections 3211, 3213, and 3214, and to all of Division 7, and to no other part of this regulation, provided that such emissions are minimized by the best modern practices, methods and concepts which may, from time to time, be reasonably applied. This section 6200 shall not require such source operations to meet emission limits more restrictive than the limits which would otherwise apply to such operations under other provisions of this regulation.

Section 6210 Electric furnaces during charging; and the doors of open hearth steel furnaces during charging.

Section 6211 Water-quenching of incandescent coke upon discharge from coke ovens, provided that this exception shall apply to such operations only after every reasonable effort has been made to minimize emissions by improving the quality of quench water.

Section 6212 Transfer of molten metals or of molten metallurgical slags.

Section 6213 Emissions from transfer ladles resulting from additions of solid materials for improving ferrous metal properties.

Section 6214 Coke ovens.

Section 6215 Emissions during a change to or a change from the use of gas supplied on an interruptible service contract by a public utility.

Section 6216 Operations which are performed solely for the movement of solid materials.

Section 6217 Material stock piles.

Section 6218 Blasting.

Section 6219 Coal-fired Hoffman-type brick-making kilns in existence on May 4, 1960.

Section 6220 Orchard heaters purchased before March 31, 1961, during emergency use to protect crops against frost damage. This exception shall terminate July 4, 1965. (Amended by Resolution No. 258, dated October 18, 1961)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
AIR POLLUTION COMMISSION
(adapted March 15, 1966)

REGULATION IV - TO CONTROL LOCAL AIR POLLUTION FROM SOURCES OF PARTICULATE OR GASEOUS MATTER EMISSIONS:

Introduction

In accordance with the provisions of the Air Pollution Control Act and the policies of the Air Pollution Commission, regulations are being developed to control area (air-basin) air pollution. Such regulations are to be based upon area air quality studies, and will be designed to control air pollution existing in various areas of the Commonwealth.

The Commission has recieved, and continues to receive, reports of local air pollution problems in the Commonwealth. Many of the problems occur where area air quality studies have not been conducted, and might not be conducted for many years. It is the purpose of this regulation to provide for the control and prevention of local air pollution anywhere in the Commonwealth (except as expressly excluded by the Air Pollution Control Act) and to provide a guide for the design of air pollution control equipment for new as well as existing sources. As area (air-basin) air pollution control regulations are adopted, they will supersede this regulation in the area concerned.

Section 1.1 Definitions.

(1) "Area (air-basin) Air Pollution." Air pollution caused by air contaminants from a multiplicity of scattered sources which are influenced by common meteorological and topographical characheristics, and intermingled and distributed so that the sources of the air comtaminants cannot be readily discerned.

(2) "Combustion Unit." Any incinerator or any stationary equipment used for the combustion of gaseous, liquid, or solid fuel.

(3) "Flue." Any duct, passage, stack, chimney, or conduit permitting air contaminants to be emitted into the open air.

(4) "Fugitive Dust." Solid airborne particulate matter emitted at or near ground level from any source other than a flue.

(5) "Gaseous Matter." One of the three states of aggregation of matter having neither independent shape nor volume and tending to expand indefinitely.

(6) "Local Air Pollution." Air pollution in a specific area readily discernible as being caused by a single source or a group of sources in close proximity to each other.

(7) "Particle Fall." Particulate matter equal to or more than 10 microns in diameter. "Particle Fall" is usually specified as the weight rate at which solid particles deposit from the atmosphere. ("Particle Fall" is used in the same sense as the terms "Dust Fall" and "Soot Fall" but without any implication as to the nature and source of the particles).

(8) "Particulate Matter." Discrete particles of liquid (except uncombined water) and/or solid matter which is often, but not always, suspended in

air or other gases at atmospheric temperature and pressure.

(9) "Property." Any freehold interest in land on which one or more sources of air contamination are located.

(10) "Ringlemann Smoke Chart." The Ringelmann Scale for Grading the Density of Smoke, published by the U.S. Bureau of Mines, or any chart, recorder, indicator or device for the measurement of smoke density which is approved by the Commission as the equivalent of said Ringelmann Scale.

(11) "Smoke." Small gas-borne particles resulting from incomplete combustion, consisting predominantly of carbon and other combustible material, and present in sufficient quantity to be observable.

(12) "Suspended Particulate Matter." Particulate matter less than 10 microns in diameter, suspended in air or other gases.

Other words and phrases used in this regulation, unless otherwise clearly indicated, shall have the meaning ascribed to them in Section 3 of the Air Pollution Control Act, the Act of January 8, 1960, P.L. 2119.

Section 1.2 Application of Regulation

This regulation shall apply in Regions I, II, III, IV, V, VI, and VII, as established by the Commission on November 30, 1960, except that as area (air-basin) air pollution control regulations are adopted by the Commission, such regulations shall supersede this regulation in the areas concerned.

Section 1.3 Limits for Particulate Matter Emissions.

In the absence of a determination by the Commission imposing more stringent or less stringent limits, as provided for in Section 1.5 of this regulation, a local air pollution problem shall be deemed to exist:

(1) If any person causes, suffers, allows, or permits smoke from any combustion unit, the shade or appearance of which is darker than No. 2 of the Ringelmann Smoke Chart, to be emitted into the outdoor atmosphere.

Exception: Smoke emitted during the cleaning of a firebox or the building of a new fire may be darker than No. 2 of the Ringelmann Smoke Chart for a period or periods aggregating not more than 6 minutes in any 60 consecutive minutes.

(2) If any person causes, suffers, allows, or permits particulate matter (including smoke) to be emitted into the outdoor atmosphere from any air contamination source in such a manner that the concentration of particulate matter from such source exceeds a ground level concentration (as determined in accordance with Section 1.6)of either 150 micrograms of suspended particulate matter per cubic meter of air or 0.6 milligrams of particle fall per square centimeter per month, at any point outside the person's property.

Whenever particulate matter from one air contamination source is discharged through two or more flues, the quantity that may be discharged from all of the flues shall not exceed the emission that would be permitted by assuming that all of the particulate matter is being emitted from a single flue having an effective height calculated in the following manner:

Multiply the effective height of each flue by the percentage of the total air contaminant emission rate emitted through the flue, add the products and divide the sum by 100.

Whenever particulate matter from more than one air contamination source is discharged through less flues than the number of air contamination sources, the quantity that may be discharged from each flue shall not exceed the emission permitted by this Section 1.3(2) for an air contamination source, except under unusual conditions (see Section 1.5).

(3) If any person causes, suffers, allows, or permits fugitive dust to be emitted into the outdoor atmosphere from any air contamination source in such a manner that the ground level concentration of fugitive dust (as determined in accordance with Section 1.6) from the air contamination source at any point outside the person's property exceeds a concentration of 2.0 milligrams per cubic meter of air above background concentration, for any 10 minute period.

Whenever a local air pollution problem is deemed to exist, the Commission may, in accordance with the procedures provided for in the Air Pollution Control Act, enter an adjudication or order directing the person or persons charged with causing, suffering, allowing, or permitting such air pollution problem to control, abate, reduce, or prevent such air pollution problem.

Section 1.4 Limits for Gaseous Matter Emissions.

(Limits for gaseous matter emissions based upon ambient air quality objectives are now being developed by the Commission. At some future date, these limits will be incorporated into this regulation in accordance with Section 5 (f) (2) and Section 7 of the Air Pollution Control Act.)

Section 1.5 Commission Determinations of Limits for Emissions from Specific Air Contamination Sources.

In certain circumstances, the Commission may impose more stringent or less stringent limits than those specified in Section 1.3 of this regulation. The Department, or any person, may petition the Commission for the imposition of more stringent or less stringent limits with respect to the provisions of this regulation as applied to a specific air contamination source. The Commission will consider the petition and such factors as:

(1) Acceptable data as to measured ground level contaminant concentrations.

(2) The toxicity and other characteristics of the air contaminant being emitted.

(3) Topographical and meteorological factors affecting the dispersion of the air contaminant being emitted.

(4) Population density in the area of the air contamination source.

(5) Industrial and residential characteristics of the area in which the air contamination source is located.

(6) The availability of practical control methods and recent steps taken to control the problem.

When the Commission determines that in order to prevent or control air pollution from a specific air contamination source, more stringent limits than those specified in Section 1.3 of this regulation are required, such determination shall be made in the form of an order. The person responsible for an air contamination source shall be notified in writing by the Commission when the Commission determines that limits less stringent than those specified in Section 1.3 of this regulation may be applied to said air contamination source.

Section 1.6 Determining Compliance with Limits for Particulate and Gaseous Matter Emissions.

When possible and practical, and in the absence of meaningful measured ground level concentrations, compliance with the limits specified for suspended particulate matter, particle fall and gaseous matter shall be determined by sampling and other measurements made at the air contamination source or sources prior to the point at which air contaminants are emitted to the atmosphere. Methods to be used in determining compliance with the requirements of this regulation shall be adopted and published by the Commission. (Guides for Compliance with Regulation IV).

Section 1.7 Sampling Facilities.

The person responsible for an air contamination source shall, upon request of the Department, provide such sampling holes, reasonably safe access, electrical power and water as may be needed to enable the Department to perform tests to determine compliance or noncompliance with this regulation.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
AIR POLLUTION COMMISSION

GUIDES FOR COMPLIANCE WITH REGULATION IV

This guide was prepared in accordance with Section 1.6 of Regulation IV, adopted by the Air Pollution Commission on March 15, 1966.

I. INTRODUCTION

Regulation IV has two main purposes:

A. To permit the Commission to bring about control of single or multiple air contamination sources which are creating specific local air pollution problems.

B. To provide a guide as to performance standards to which air pollution control equipment can be specified and designed.

It is the intent of the Commission to apply Regulation IV to those specific sources creating local air pollution problems which come to the notice of the Commission. In the main, such problems will come to the notice of the Commission through written complaints from persons who are affected or whose property is affected. The Department may also initiate a complaint.

II. PURPOSE

Section 1.6 of Regulation IV provides that "Methods to be used in determining compliance with the requirements of this regulation, shall be adopted and published by the commission." Therefore, it is the purpose of this guide to describe the procedures to be used in:

A. Determining allowable weight-rate of suspended particulate matter and particle fall emission from air contamination source as provided for in Section 1.3(2) of Regulation IV.

B. Determining the actual concentrations and weight-rate of suspended particulate matter and particle fall emitted from an air contamination source.

C. Determining by sampling, the concentration of fugitive dust emitted from an air contamination source (Section 1.3 (3) of Regulation IV).

III. GUIDE

A. Determining the allowable weight-rate emission of Suspended Particulate Matter--Graph No. 1 and Particle Fall--Graph No. 2. See Appendix for derivation of the graphs.

$\underline{Q_a}$ = allowable emission rate.

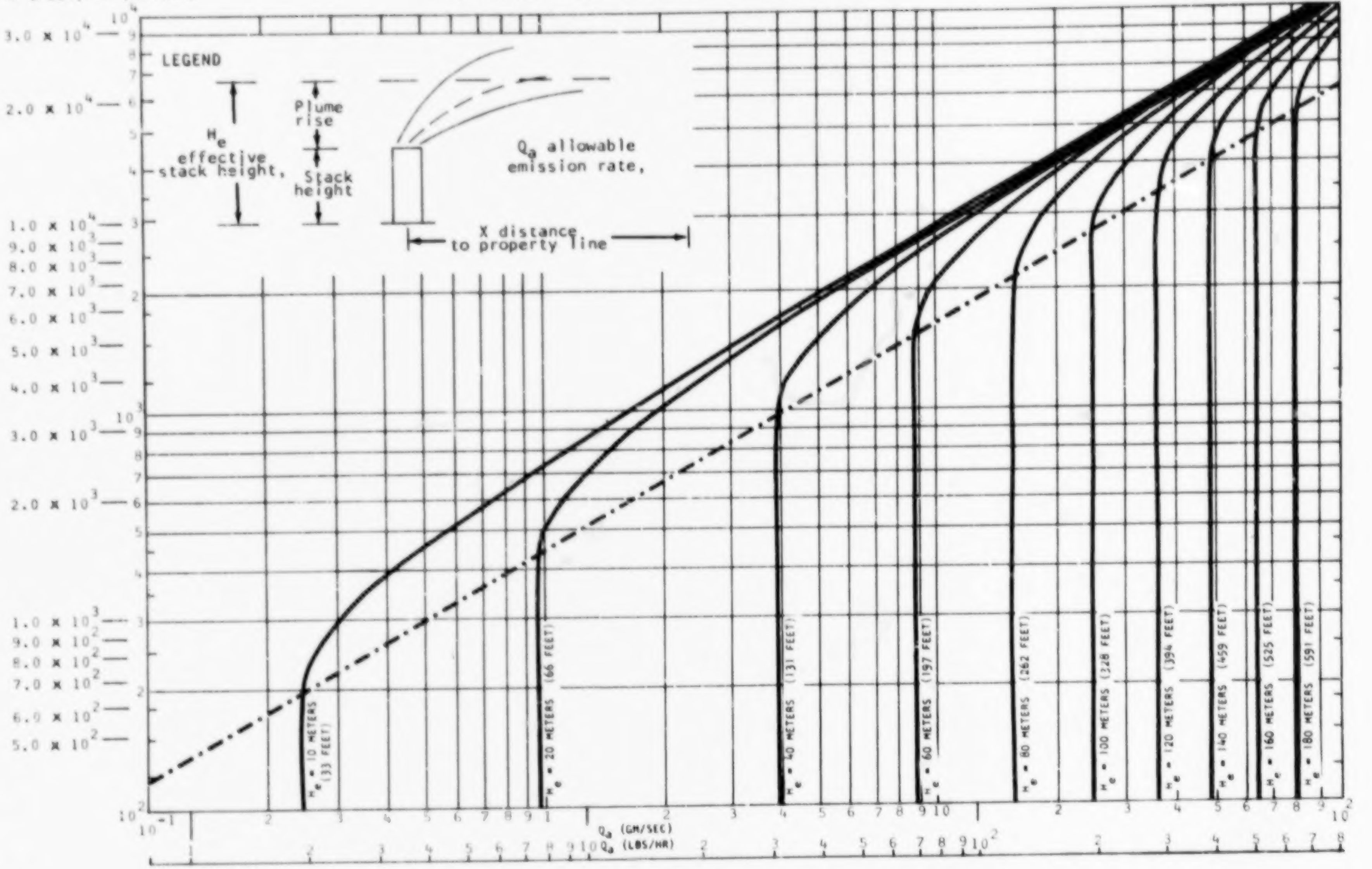
$\underline{H_e}$ = effective stack height. The effective stack height is the stack height plus the height that the effluent plume initially rises above the stack owing to the stack draft velocity and/or the buoyancy of the effluent. For information on how to calculate probable plume rise see Appendix pages.

$\underline{X}$ = the horizontal distance from the stack to the nearest property line.

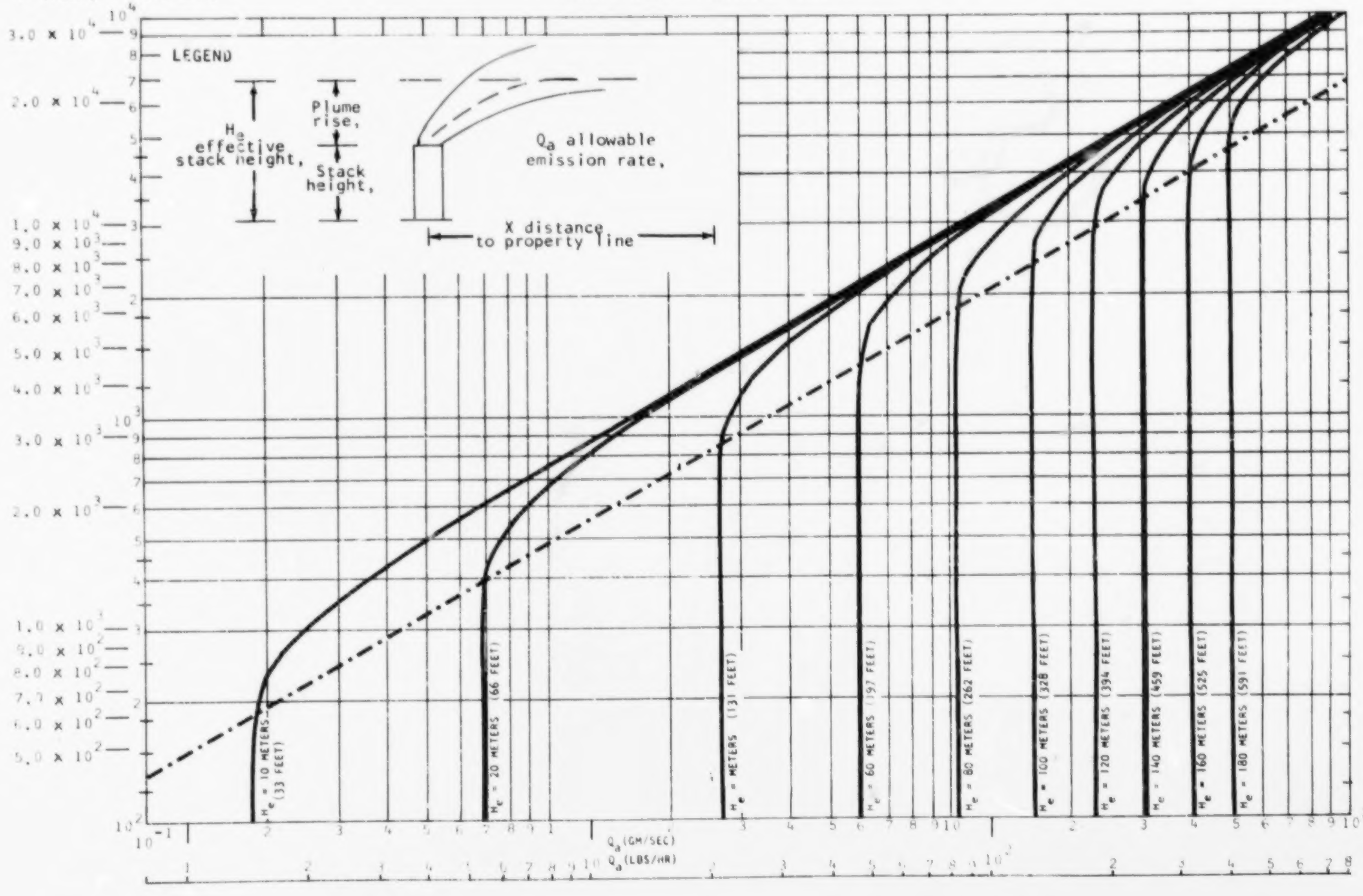
The Q_a for suspended particulate matter and the Q_a for particle fall are determined from Graphs No. 1 and No. 2, respectively.

B. Determining the actual concentration and weight-rate of particulate emissions from an air contamination source. When possible and practical, this determination shall be made by sampling in a flue, breeching or other convenient point. Sampling procedures, similar to those described in References (1), (2), (3), (4), and (5), shall be used to determine the nature and amount of emissions from a flue. Isokinetic sampling procedures shall be used in sampling for particulate matter emissions. The particle size distribution of particulate matter

GRAPH NO.1 SUSPENDED PARTICULATE MATTER



GRAPH NO.2 PARTICLE FALL



shall be determined by employing methods similar to those described in References (6), (7), and (8).

Results shall be reported as grams of particulate matter per second (total weight-rate of emission), and the percentage concentration (by weight) of particulate matter in the flue. The percentage (by weight) of particulate matter equal to and larger than 10 microns in diameter also shall be reported. (Reference 9).

The following additional information shall be obtained while the test is conducted and included in the report of test results:

1. Temperature, static pressure and percent moisture of the gas stream.
2. % CO, % CO_2, % O_2, % N_2 (When combustion processes are involved.)
3. Process conditions, e. g., charging rate of raw material or rate of production of final product, boiler pressure, oven temperature and other conditions which may affect emissions from the process.

Sampling and particle size determination procedures may be modified in any manner consistent with obtaining accurate results which are truly representative of the conditions being evaluated. Any modifications to the above referenced procedures should be clearly indicated in the report of test results.

When it is not possible or practical to determine the rate and nature of emissions by sampling in a flue, the following procedures (or other procedures approved by the Commission) may be used:

1. Estimating the weight-rate of emission by performing a "material balance" (difference between process input weight and output weight) for the process or operation.
2. Estimating the weight-rate of emission using acceptable estimating techniques such as contained in References (10), (11), (12), and (13) or other techniques approved by the Commission.

C. Determining, by sampling, the concentration of fugitive dust in the outdoor atmosphere. Samples for fugitive dust shall be obtained using a portable electrostatic precipitator as described in References (14) and (15).

1. All samples shall be taken for not less than a ten-minute period.
2. Samples to determine fugitive dust concentrations shall be taken downwind of the source at any point outside the property on which the source of air contamination is located.
3. Samples to determine average background fugitive dust concentrations shall be taken upwind of the specific source of air contamination.

4. Sampling and identification procedures for fugitive dust may be modified in any manner consistent with obtaining accurate results which are truly representative of the conditions being evaluated.

APPENDIX

SUSPENDED PARTICULATE MATTER AND PARTICLE FALL GRAPHS AND COMPUTATION OF EFFECTIVE STACK HEIGHT

I. Graph No. 1 - Suspended Particulate Matter

This graph was developed from Sutton's equation:

$$Q_a = \frac{X \quad u\, C^2\, X^{2-n}}{2} \qquad \exp \frac{{H_e}^2}{C^2\, X^{2-n}}$$

where,

Q_a = allowable emission rate, grams per second

χ = ground level concentration, 150 micrograms per cubic meter (Section 1.3 (2) of Regulation IV)

π = 3.14

$\bar{u}$ = mean wind speed set at 3.8 meters per second

c^2 = isotropic diffusion coefficient, set at 0.010 for neutral conditions, with dimensions, m^n

X = downwind distance from source, meters

n = stability parameter, nondimensional, set at 0.25

exp = exponential function, e = 2.72

H_e = effective stack height, meters

Substituting the above values, the equation becomes:

$$Q_a = 8.95 \times 10^{-6} X^{1.75} \quad \exp \quad \frac{100 H_e^2}{x^{1.75}}$$

For Graph No. 1 effective stack heights of 10, 20, 40, 60, 80, 100, 120, 140, 160, and 180 meters were plotted while downwind distance ranged from 100 to 10,000 meters. This graph shows the solution only for region where Q_a increases with X. The region where Q_a decreases with X has been replaced by a vertical line.

II. Graph No. 2 - Particle Fall

This graph was developed from a modified form of Sutton's equation:

$$Q_a = \chi \pi \bar{u} C^2 X^{2-n} \quad \exp \quad \frac{(z)^2}{C^2 X^{2-n}}$$

where,

Q_a = allowable emission rate, grams per second

χ = ground level concentration in grams per cubic meter determined by dividing ground level particle fall rate χ^* (2.22 x 10^{-6} grams per square meter per second (0.6 milligram per square centimeter per month - Section 1.3 (2) of Regulation IV) by v, the terminal settling velocity 0.03 meter per second for quartz 25 micron particle size (Reference 19).

π = 3.14

$\bar{u}$ = mean wind speed, set at 3.8 meters per second

C^2 = isotropic diffusion coefficient, set at 0.010 for neutral conditions with dimensions, m^n.

x = downwind distance from source, meters

n = stability parameter, nondimensional, set at 0.25 for neutral stability conditions

exp = exponential function, e = 2.72

z = elevation of plume above ground adjusted for particle fall

$$z = H_e - \frac{X\,v}{\bar{u}}$$

where,

H_e = effective stack height, meters

v = terminal settling velocity (0.03 meter per second)

Substituting the above values into the equation, the allowable emission rate for particle fall becomes:

$$Q_a = 8.83 \times 10^{-6} \; x^{1.75} \; \exp \frac{100 \; (H_e - 7.89 \times 10^{-3} \; x)^2}{x^{1.75}}$$

For Graph No. 2, stack heights of 10, 20, 40, 60, 80, 100, 120, 140, 160, and 180 meters were plotted while distances downwind ranged from 100 to 10,000 meters. This graph shows the solution only for the region where Q_a increases with X. The region where Q_a decreases with X has been replaced by a vertical line.

III. Computation of Effective Stack Height

The effective stack height is the physical stack height plus the height that the effluent plume initially rises above the stack owing to the stack draft velocity and/or the buoyancy of the effluent. Unless it can be demonstrated otherwise, for a stack with low heat emissions (the temperature of the flue gas equal to, or less, than 65° F.) the effective stack height is calculated by the following equation:

$$H_e = H + d \frac{V_s}{u} 1 + \frac{\Delta T}{T_s}$$

where,

H_e = effective stack height, meters

H = height of stack, meters

V_s = stack gas ejection velocity, meters per second

d = internal diameter of stack top, meters

u = wind speed, meters per second (Assume 3.8 meters per second unless other acceptable meterological data are available for the stack locality.)

ΔT = stack gas temperature minus ambient air temperature, ^{o}K. (Assume ambient air temperature is 283^{o}K unless other acceptable meteorological data are available for stack locality.)

T_s = stack gas temperature, ^{o}K

Unless it can be demonstrated otherwise, for a stack with large heat emission (the temperature of the flue gas greater than 65^{o}F) the effective stack height is calculated by the following equation:

$$H_e = H + \frac{(1.5 \; V_s \; d + 4.09 \times 10^{-5} \; Q_h)}{u}$$

where,

H_e = effective stack height, meters

H = stack height, meters

V_s = stack gas ejection velocity, meters per second

u = wind speed, meters per second (Assume 3.8 meters per second unless other acceptable meteorological data are available for the stack locality.)

d = internal diameter of stack top, meters

Q_h = heat emission rate of stack gas relative to ambient atmosphere, calories per second

$$Q_h = Q_m C_{ps} \Delta T$$

where,

Q_m = mass emission rate of stack gas, grams per second

C_{ps} = specific heat of stack gas at constant pressure calories per gram per ^oK

$\Delta T = T_s - T$

T_s = temperature of stack gas at stack top, ^oK

T = temperature of ambient atmosphere, ^oK (Assume ambient atmospheric temperature is 283^oK unless other acceptable meteorological data are available for the stack locality.

CITY OF ST. LOUIS, MISSOURI
AIR POLLUTION CONTROL ORDINANCE
54699
(approved March 27, 1967)

Section 11. Restriction of Emission of Particulate Matter from Industrial Processes.

A. General Provisions.

1. This Section applies to any operation, process or activity except the burning of fuel for indirect heating in which the products of combustion do not come into direct contact with process materials and except the burning of refuse and except the processing of salvageable material by burning, and except existing foundry cupolas.

2. Process weight per hour is the total weight of all materials introduced into any specific process which process may cause any discharge of particulate matter. Solid fuels charged will be considered as part of the process weight, but liquid and gaseous fuels and combustion air will not. For a cyclical or batch operation, the process weight per hour will be derived by dividing the total process weight by the number of hours in one complete operation from the beginning of any process to the completion thereof, excluding any time during which the equipment is idle. For a continuous operation, the process weight per hour will be derived by dividing the process weight for a typical period of time by said time period.

3. The process weight per hour referred to in this section shall be based upon the normal operation maximum capacity of the equipment and if such normal maximum capacity should be increased by process or equipment changes, the new normal maximum capacity shall be used as the process weight in determining the allowable emissions.

4. Emission tests relating to this regulation shall be made following the standards in ASME "Power Test Code PTC 27" dated 1957 and entitled "Determining Dust Concentration in a Gas Stream" as set forth in Appendix C.

B. Emission Limitations.

1. Except as provided for in Section B (2) no person shall cause, suffer, allow, or permit the emission of particulate matter in any one hour from any source in excess of the amount shown in Table 1 for the process weight allocated to such source.

2. The limitations established by Section B (1) shall not require the reduction of particulate matter concentration, based on the source gas volume, below the concentration specified in Table 2 for such volume; provided that, for the purpose of this subsection B (2) the person responsible for the emission may elect to substitute a volume determined according to the provisions of subsection B (3); and provided further that the burden of showing the source gas volume or other volume substituted therefor, including all the factors which determine such volume and the methods of determining and computing such volume, shall be on the person seeking to come within the provisions of this subsection B (2).

3. Any volume of gases passing through and leaving an air pollution abatement operation may be substituted for the source gas column of the source operation served by such air pollution abatement operation, for the purposes of subsection B (2), provided such air abatement operation emits no more than 40 percent of the weight, of particulate matter entering thereto; and provided further that such substituted volume shall be corrected to standard conditions and to a moisture content no greater than that of any gas stream

entering such air pollution abatement operation.

4. No person shall cause, suffer, allow, or permit the emission of particulate matter from any source in a concentration in excess of 0.30 grain per standard cubic foot of exhaust gases. If provisions of this subsection B (4) would permit a greater emission of particulate matter per hour than allowed by subsection B (1), the provision of this subsection B (4) shall not apply.

5. No person shall cause or permit the emission of any particulates larger than sixty (60) microns in diameter from any vent, stack, chimney or duct.

TABLE 1

Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
Lb/hr	Tons/hr	Lb/hr	Lb/hr	Tons/hr	Lb/hr
100	0.05	0.551	16,000	8.00	16.5
200	0.10	0.877	18,000	9.00	17.9
400	0.20	1.40	20,000	10.00	19.2
600	0.30	1.83	30,000	15.00	25.2
800	0.40	2.22	40,000	20.00	30.5
1,000	0.50	2.58	50,000	25.00	35.4
1,500	0.75	3.38	60,000	30.00	40.0
2,000	1.00	4.10	70,000	35.00	41.3
2,500	1.25	4.76	80,000	40.00	42.5
3,000	1.50	5.38	90,000	45.00	43.6
3,500	1.75	5.96	100,000	50.00	44.6
4,000	2.00	6.52	120,000	60.00	46.3
5,000	2.50	7.58	140,000	70.00	47.8
6,000	3.00	8.56	160,000	80.00	49.0
7,000	3.50	9.49	200,000	100.00	51.2
8,000	4.00	10.4	1,000,000	500.00	69.0
9,000	4.50	11.2	2,000,000	1,000.00	77.6
10,000	5.00	12.0	6,000,000	3,000.00	92.7
12,000	6.00	13.6			

Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation

$$E = 4.10\ P^{0.67}$$

and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$, where E = rate of emission in lb/hr and

P = process weight rate in tons/hr

TABLE 2

Source Gas Volume, SCFM[a]	Concentration GR/SCF[b]	Source Gas Volume, SCFM[a]	Concentration GR/SCF[b]
7,000 or less	0.100	140,000	0.038
8,000	0.096	160,000	0.036
9,000	0.092	180,000	0.035
10,000	0.089	200,000	0.034
20,000	0.071	300,000	0.030
30,000	0.062	400,000	0.027
40,000	0.057	500,000	0.025
50,000	0.053	600,000	0.024
60,000	0.050	800,000	0.021
80,000	0.045	1,000,000 or more	0.020
100,000	0.042		
120,000	0.040		

[a] Standard cubic foot per minute

[b] Grain per standard cubic foot

Section 12. Restrictions of Emissions of Particulate Matter from Existing Foundry Cupolas.

A. Every existing foundry cupola shall be equipped with air pollution control equipment which collects not less than 85% of the particulate matter which would be emitted without the use of such control equipment.

B. No person shall cause, suffer, allow or permit the emission of particulate matter from any existing foundry cupola in a concentration in excess of 0.40 grains per standard dry cubic foot of exhaust gas. If provisions of this subsection would permit an emission of a greater weight of particulate matter per hour than is allowed by subsection A hereof, then the provisions of this subsection shall not apply.

HAMMOND, INDIANA

ORDINANCE NO. 3522

ARTICLE VI

Section 6.4 EMISSION OF PARTICULATE MATTER FROM INDUSTRIAL PROCESS EQUIPMENT

The maximum allowable emission of particulate matter from any source whatever except fuel-burning and refuse-burning equipment shall be determined from Table 1, as set forth on page 26 hereof. To use the table, find the process weight per hour in the table, and note the allowable rate of emissions in pounds per hour next to the process weight per hour.

For those processes whose process weight exceeds 200 tons/hr, the maximum allowable emission may exceed that shown in Table 1 provided that the concentration of particulate matter in the discharge gases is less than 0.05 grains per standard cubic foot of gas.

TABLE I

ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE (a)

Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
lb/hr	tons/hr	lb/hr	lb/hr	tons/hr	lb/hr
100	0.05	0.551	12,000	6.00	13.6
200	0.10	0.877	16,000	8.00	16.5
400	0.20	1.400	18,000	9.00	17.9
600	0.30	1.830	20,000	10.00	19.2
800	0.40	2.220	30,000	15.00	25.2
1,000	0.50	2,580	40,000	20.00	30.5
1,500	0.75	3.380	50,000	25.00	35.4
2,000	1.00	4.100	60,000	30.00	40.0
2,500	1.25	4,760	70,000	35.00	41.3
3,000	1.50	5.380	80,000	40.00	42.5
3,500	1.75	5.960	90,000	45.00	43.6
4,000	2.00	6.520	100,000	50.00	44.6
5,000	2.50	7.580	120,000	60.00	46.3
6,000	3.00	8.560	140,000	70.00	47.8
7,000	3.50	9.490	160,000	80,00	49.0
8,000	4.00	10.400	200,000	100.00	51.2
9,000	4.50	11.200	400,000	200.00	58.8
10,000	5.00	12.000			

(a) Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation $E = 4.10P^{0.67}$ and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$$E = 55.0\,P^{0.11} - 40,$$ where E = rate of emission in lb/hr and

P = process weight rate in tons/hr

Other jurisdictions using this ordinance are: East Chicago, Illinois
Gary, Indiana

EMISSIONS FROM ASPHALT PLANTS

STATE OF FLORIDA
AIR POLLUTION CONTROL
COMMISSION RULES

Asphalt Batch Plant

(2) Particulate Matter. No person shall cause, let, permit, suffer or allow the emission of particulate matter from any air pollutant source in total quantities in excess of the amount shown in Table I, except as provided in subsection 170C-9.07 (2), or as specifically hereinafter set forth.

(a) It shall be the intent of this section to set forth a maximum allowable particulate emission (with exceptions). Where technology is such that lesser quantities of particulate emission can be attained, such technology shall govern.

(b) The maximum discharge of particulate matter from permanent asphalt plants shall be 0.3 grain per standard cubic foot of dry gas.

(c) No portable asphalt plant shall be operated within the State of Florida unless:

1. The maximum discharge of particulate matter is 0.3 grain per standard cubic foot of dry gas, or

2. It can be shown that within a circle centered on the plant and having a radius of one (1) mile, there are a maximum of two (2) occupied residences.

170C-9.07. Exceptions

1. When a firebox, boiler or motor combustion device is being cleaned out or fire is being started therein, air pollutants the density of which is equal to number two (2) on the Ringelmann Chart, shall be permitted for a period not to exceed a total of three (3) minutes during any thirty (30) minute period of time.

2. Table I shall not apply to asphalt plants, incinerators or power plants.

WEST VIRGINIA ADMINISTRATIVE REGULATIONS
AIR POLLUTION CONTROL COMMISSION
CHAPTER 16-20
Series III
(1966)

Subject: Regulation III - To Prevent and Control Air Pollution From the Operation of Hot Mix Asphalt Plants.

Section 2. Emission of Smoke Prohibited and Standards of Measurement.

2.01. No person shall cause, suffer, allow or permit emission of smoke into the open air from any fuel burning equipment which is as dark or darker in shade or appearance as that designated as No. 1 on the Ringelmann Smoke Chart.

2.02. The provisions of Subsection 2.01 of this Section shall not apply to smoke emitted during the starting operation the shade or appearance of which is less than No. 3 of the Ringelmann Smoke Chart for a period or periods aggregating no more than 4 minutes per start-up.

2.03. The equivalent opacity of those Ringelmann numbers in Subsection 2.01 and Subsection 2.02 of this Section shall be used as a guide in the enforcement of Section 3 of this Regulation.

Section 3. Control and Prohibition of Particulate Emission.

3.01. No person shall cause, suffer, allow or permit particulate emission from a plant into the open air in excess of the quantity as listed in the following table:

Aggregate Process Rate Pounds Per Hour	Stack Emission Rate Pounds Per Hour
10,000	10
20,000	16
30,000	22
40,000	28
50,000	31
100,000	33
200,000	37
300,000	40
400,000	43
500,000	47
600,000	50

For a process weight between any two consecutive process weights stated in this table, the emission limitation shall be determined by interpolation.

3.02. In the case of more than one stack to a hot mix asphalt plant, the emission limitation of Subsection 3.01 of this Section will be based on the total emission from all stacks.

3.03. No person shall cause, suffer, allow or permit a plant to operate that is not equipped with a fugitive dust control system. This system shall be operated and maintained in such a manner as to prevent the emission of particulate material from any point other than the stack outlet.

3.04. The owner or operator of the plant shall maintain dust control of the plant premises and plant owned, leased, or controlled access roads by paving, oil treatment, or other suitable measures. Good operating practices shall be observed in relation to stockpiling, screen changing, and general maintenance to prevent dust generation and atmospheric entrainment. Good operating practices, including water spraying or other suitable measures, shall be employed to minimize dust generation and atmospheric entrainment when hot bins are pulled.

Section 4. Registration.

4.01. Within thirty (30) days after the effective date of this regulation, all persons operating asphalt mix plants within the state shall have registered with the Commission on forms to be made available by the Commission, the name of the person, company, or corporation operating the plant, the address, location, county, ownership (lessee & lessor), the principal officer of the company, and any other such reasonable information as the Commission may require including but not necessarily limited to capacity of the plant, type of fuel used, plant operating schedule, description of rotary drier, height and size of stack and description of dust control equipment.

4.02. When such plants are modified by changes in burner design, heating fuel, fan capacity, drier design, air pollution control equipment, or like changes which significantly effect the emission characteristics of the plants then they shall be re-registered with the Commission defining those changes within thirty (30) days after being placed in operation.

SULPHUR COMPOUND EMISSION CONTROL

METROPOLITAN DADE COUNTY, FLORIDA
POLLUTION CONTROL ORDINANCE
ORDINANCE NO. 63 - 14
ARTICLE III
(adopted April 23, 1963)

Section 3.03 SULFUR DIOXIDE.

1. No person shall cause, let, permit, suffer or allow any emission of sulfur dioxide which results in ground level concentrations of sulfur dioxide at any given point in excess of 1.0 ppm (volume) in a 20-minute period of any hour and average exposure shall not exceed 0.1 ppm (volume) of sulfur dioxide in any 8-hour period. These limitations shall not apply to ground level concentrations occurring on the property from which such emission occurs, provided such property, from the emission point to the point of any such concentration is controlled by the person responsible for such emission.

2. Except as provided in Subsection 1 above, no person shall cause, let, permit, suffer or allow the emission of gas containing sulfur dioxide in excess of 2000 ppm (volume). All sampling of exhaust gases shall be conducted following techniques designated by the Pollution Control Officer. For purposes of this section, all sulfur present in gaseous compounds containing oxygen shall be deemed to be present as sulfur dioxide, and analyses of samples taken to determine the amount of sulfur dioxide in exhaust gases shall be made as specified by the Air Pollution Control Officer. Tests for determining compliance with this section shall be for at least 15 consecutive minutes or 90 percent of the time of actual source operation, whichever is less.

COUNTY OF LOS ANGELES, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION IV. PROHIBITIONS
(amended June 1, 1965)

RULE 53. (Amended 1-16-58) SPECIFIC CONTAMINANTS. A person shall not discharge into the atmosphere from any single source of emission whatsoever any one or more of the following contaminants, in any state or combination thereof, exceeding in concentration at the point of discharge:

a. Sulphur Compounds calculated as sulphur dioxide (SO_2): 0.2 percent, by volume.

b. (Does not pertain to this section. Listed under "Regulations Pertaining to Particulate Emissions from Fuel Burning Plants" section of this report.)

RULE 62. (Amended 3-16-61) SULFUR CONTENTS OF FUELS. A person shall not burn within the Los Angeles Basin at any time between May 1 and September 30, both dates inclusive, during the calendar year 1959, and each year thereafter between April 15 and November 15 both inclusive, of the same calendar year, any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions, or any liquid fuel or solid fuel having a sulfur content in excess of 0.5 percent by weight.

The provisions of this rule shall not apply to:

a. The burning of sulfur, hydrogen sulfide, acid sludge or other sulfur compounds in the manufacturing of sulfur or sulfur compounds.

b. The incinerating of waste gases provided that the gross heating value of such gases is less than 300 Btu's per cubic foot at standard conditions and - the fuel used to incinerate such waste gases does not contain sulfur or sulfur compounds in excess of the amount specified in this rule.

c. The use of solid fuels in any metallurgical process.

d. The use of fuels where the gaseous products of combustion are used as raw materials for other processes.

e. The use of liquid or solid fuel to propel or test any vehicle, aircraft, missile, locomotive, boat or ship.

f. The use of liquid fuel whenever the supply of gaseous fuel, the burning of which is permitted by this rule, is not physically available to the user due to accident, act of God, act of war, act of the public enemy or failure of the supplier.

RULE 62.1 (Adopted 1-14-64) A. A person shall not burn within the Los Angeles Basin at any time between the days of November 16 of any year and April 14 of the next succeeding calendar year, both dates inclusive, any fuel described in the first paragraph of Rule 62 of these Rules and Regulations.

b. The provisions of this Rule do not apply to:

(1) Any use of fuel described in Subsections a, b, c, d, e, and f of said Rule 62 under the conditions and for the uses set forth in said Subsections.

(2) The use of liquid fuel during a period for which the supplier of gaseous fuel, the burning of which is not prohibited by this Rule, interrupts the delivery of gaseous fuel to the user.

c. Every holder of, and every applicant for a permit to operate fuel-burning equipment under these Rules and Regulations shall notify the air pollution control officer in the manner and form prescribed by him, of each interruption in and resumption of delivery of gaseous fuel to his equipment.

CITY OF NEW YORK, NEW YORK
AIR POLLUTION CONTROL CODE
LOCAL LAW 14 - EMISSION STANDARDS
(effective May 20, 1966)

EMISSION OF SULFUR COMPOUNDS FROM EQUIPMENT USED IN A MANUFACTURING PROCESS: VOLUME STANDARD

Section 893-1.0. Sulfur Content of Fuel; Restricted.

A. No person shall cause or permit the use, or, if intended for use in the city of New York, the purchase, sale, offer for sale, storage or transportation, of fuel which, as determined by the methods of the American Society for Testing and Materials, contains more than the following percentages of sulfur by weight:

1. For a period of two years and four months beginning eight months after the effective date of this Section:

   (a) coal: 2.2 percent
   (b) residual fuel oil: 2.2 percent

2. For a period of two years beginning three years after the effective date of this Section:

   (a) coal: 2.0 percent
   (b) residual fuel oil: 2.0 percent

3. Thereafter:

   (a) coal: 1.0 percent
   (b) residual fuel oil: 1.0 percent

B. Upon the application of any person engaged in the operation of fuel burning equipment using coal or residual fuel oil as a fuel, the Commissioner may issue a certificate of exemption from the sulfur content restrictions imposed by this Section, provided that the applicant shall prove to the satisfaction of the Commissioner that the fuel burning equipment is operated in such a manner or is equipped with such control apparatus as to continuously prevent the emission of any sulfur compound or compounds in amounts greater than those that would be emitted from the burning in the same fuel burning equipment, without such control apparatus, of coal or residual fuel oil containing an amount of sulfur by weight not in excess of the maximum amount permitted at the applicable time by this Section.

1. As a condition for the issuance of or the continuation or renewal of a certificate of exemption as provided for in this Section, the applicant shall be required to install scientific monitoring devices capable of continuously recording emissions of sulfur compounds and shall be required to submit such emission information to the department each day; such installations shall be at the expense of the applicant.

2. The emission of any sulfur compound or compounds in an amount greater than permitted by the terms of a certificate of exemption issued pursuant to this Section is prohibited. In the event that the operation of fuel burning equipment results in an emission prohibited by this Section, the Commissioner may suspend or revoke the certificate of exemption or take such other action as he may deem appropriate.

3. A certificate of exemption or any renewal thereof shall be valid for a period of one year from the date of issuance, unless sooner suspended or revoked, and may be renewed upon application to the Commissioner.

C. Upon the application of any person engaged in the operation of fuel burning equipment using coal or residual fuel oil as fuel, the Commissioner may issue a temporary certificate of exemption from the sulfur content restrictions imposed by this Section, provided that the applicant shall prove to the satisfaction of the Commissioner that the application is for the purpose of conducting an experimental operation prior to submission of an application for a certificate of exemption pursuant to this Section.

1. A temporary certificate of exemption shall be valid for a period of three months from the date of issuance, unless sooner suspended or revoked, and may be renewed for an additional three months upon application to the Commissioner, and shall not be further renewed.

2. As a condition for the issuance of or the continuation or renewal of a temporary certificate of exemption as provided for in this Section, the applicant shall be required to install scientific monitoring devices capable of continuously recording emissions of sulfur compounds and shall be required to submit such emission information to the department each day; such installations shall be at the expense of the applicant.

D. An application for a certificate of exemption or temporary certificate of exemption, as provided in this Section, shall be made by the owner or lessee of the fuel burning equipment, or his agent, on forms furnished by the department.

1. In addition to such other information as required by the Commissioner, the application shall specify the kind and amount of fuel for which exemption is sought and shall describe the location and manner of operation of the fuel burning equipment. Any certificate of exemption or temporary certificate of exemption issued by the Commissioner shall be limited to the kind and amount of fuel specified, and to use in the equipment described, or shall be further limited as determined by the Commissioner.

2. A separate application for a certificate of exemption or temporary certificate of exemption shall be made for each unit of fuel burning equipment for which exemption is sought.

E. In addition to the conditions and limitations for the issuance of a certificate of exemption or temporary certificate of exemption specified in this Section, the Commissioner may provide such further conditions or limitations as he may deem appropriate.

AIR POLLUTION CONTROL REGULATION FOR ST. LOUIS METROPOLITAN AREA

(adopted February 22, 1967, by Missouri Air Conservation Commission)

Regulation X RESTRICTION OF EMISSIONS OF SULFUR DIOXIDE FROM USE OF FUEL

A. General Provisions

1. This regulation shall apply to any installation in which fuel is burned and in which the sulfur dioxide emission is substantially due to the content of the fuel burned, and in which the fuel is burned primarily to produce heat.

2. For purposes of this regulation, a fuel burning installation is any single fuel burning furnace or boiler or other unit, device, or contrivance in which fuel is burned or any grouping of two or more such furnaces or boilers or other units, devices, or contrivances on the same premises or otherwise located in close proximity to each other and under control of the same person. The capacity of such installations shall be the manufacturer's or designer's guaranteed maximum heat input rate.

3. The method for determining the percent of sulfur in coal shall be that described in ASTM D-271-64 Laboratory Sampling and Analysis of Coal and Coke or equivalent method approved by the Executive Secretary. The method for determining the heat content of coal shall be as described in ASTM D-271-64 Laboratory Sampling and Analysis of Coal and Coke or D-2015-62T Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter. Sulfur content of coal as stated in this regulation shall be as analyzed on a dry basis, but calculated to include normal moisture.

The method for determining the sulfur content of fuel oil shall be that described in ASTM D-129-64 Standard Method of Test for Sulfur in Petroleum Products and Lubricants by the Bomb Method.

The method for determining the heat content of fuel oil shall be that described in ASTM D-240-64 "Standard Method of Test for Heat of Combustion of Liquid Hydrocarbons by Bomb Calorimeter" or other method giving comparable results.

The testing methods specified in this subsection are hereby made a part of this regulation by reference.

4. The Executive Secretary is authorized to take or cause to have taken samples of any fuel by any approprate means, in any quantity which he finds necessary, at any reasonable time or place, for purposes of determining compliance with this regulation. Where applicable, the following methods will be used:

For coal:	ASTM D-492-48 (1958) Sampling Coal Classified According to Ash Content
	ASTM D-2013-65T Preparing Coal Sample for Analysis
	ASTM D-2234-65T Mechanical Sampling of Coal
For oil:	ASTM D-270-65T Sampling Petroleum and Petroleum Products

The methods specified in this Subsection are hereby made a part of this regulation by reference.

B. Restrictions Applicable to Fuel Burning Installations With A Capacity of 2,000 Million or More British Thermal Units Per Hour

1. After three (3) years from effective date of this regulation, no person shall cause or permit the emission of sulfur dioxide to the atmosphere from any fuel burning installation with a capacity of 2,000 million or more Btu's per hour in an amount greater than 2.3 pounds of sulfur dioxide per million Btu's of heat input to the installation.

2. On and after the effective date of this regulation and until the requirements of subsection B(1) of this regulation are met, no fuel burning installation with a capacity of 2,000 million or more Btu's per hour shall burn a fuel or fuels having a higher average sulfur content than the fuel or fuels used in such installation during the 12 months prior to the effective date of this regulation based on a comparable Btu content. For purposes of determining compliance with this subsection, the average sulfur content of all fuel or fuels used for the 12 month period prior to the effective date of this regulation shall be determined by averaging the sulfur content of all fuel used during such period, on the basis of pounds of sulfur per million Btu's heating value of the fuel or fuels. This computed sulfur content shall not be exceeded during any 12 month period after the effective date of this regulation, when determined on the same averaging basis.

Persons responsible for installations subject to Section B of this regulation shall furnish the Executive Secretary such data as he may reasonably require to determine whether an installation is being operated in compliance with this subsection of this regulation.

C. Restrictions Applicable to Fuel Burning Installations With A Capacity of Less Than 2,000 Million British Thermal Units Per Hour

1. During the months of December, 1968 and January, 1969 no person shall burn or permit the burning of any coal containing more than 2.0 percent sulfur or of any fuel oil containing more than 2.0 percent sulfur, in any fuel burning installation having a capacity of less than 2,000 million Btu's per hour.

2. During the months of November and December, 1969 and January and February, 1970 no person shall burn or permit the burning of any coal containing more than 2.0 percent sulfur or of any fuel oil containing more than 2.0 percent sulfur in any fuel burning installation having a capacity of less than 2,000 million Btu's per hour.

3. During the months of October, November and December of 1970 and January, February and March of 1971 and every year thereafter, no person shall burn or permit the burning of any coal containing more than 2.0 percent sulfur or of any fuel oil containing more than 2.0 percent sulfur in any fuel burning installation having a capacity of less than 2,000 million Btu's per hour.

4. Subsections 1, 2 and 3 of this section C shall not apply to any fuel burning installation if it can be shown that emissions of sulfur dioxide from such installation into the atmosphere will not exceed 2.3 pounds per million Btu of heat input to the installation.

D. Unlawful Conduct

It shall be unlawful for any person to import, sell, offer for sale, expose for sale, exchange, deliver or transport for use and consumption in the St. Louis metropolitan area or to use or consume in said area any fuel which is not from an approved source or which does not meet the requirements of this regulation unless it is shown by any such person that emission of sulfur dioxide from use of such fuel will not exceed 2.3 pounds of sulfur dioxide per million Btu's of heat input to the installation in which it is to be burned.

Regulation XIV EMISSION OF CERTAIN SULFUR COMPOUNDS RESTRICTED

A. General Provisions

1. Section B of this regulation shall apply to all emissions except those in which both

a. fuel is burned primarily to produce heat, and

b. the sulfur compound emission is due primarily to the sulfur in the fuel burned.

2. Sections C and D shall apply to all emissions from any source or sources whatsoever.

3. The method of measuring sulfur trioxide and sulfuric acid or any combination thereof in stack gases shall be:

Particulates (H_2SO_4 - Acid Mists)

Atmospheric Emissions from Sulfuric Acid Manufacturing Processes, Ref. Public Health Service Publication 999-AP-13 (1965), Appendix B. pp.61-6.

(Modified Monsanto Company Method)*

Gaseous (SO_3-SO_2)

Atmospheric Emissions from Sulfuric Acid Manufacturing Processes. Ref. Public Health Service Publication 999-AP-13 (1965), Appendix B. pp. 85-7.

(Shell Development Company Method)**

4. The method of measuring hydrogen sulfide in the ambient atmosphere shall be:

Lead-Acetate-Impregnated Filter Paper Procedure

Ref. Sensenbaugh, J. D., and Hemeon, W.C.L.: A Low Cost Sampler for Measurement of Low Concentration of Hydrogen Sulfide. Air Repair 4:5 (May 1954).

5. The method of measuring sulfur dioxide in stack gases shall be:

Gaseous (SO_3-SO_2)

Atmospheric Emissions from Sulfuric Acid Manufacturing Processes, Ref. Public Health Service Publication 999-AP-13 (1965), Appendix B. pp. A1-5.

(Shell Development Company Method)[b]

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*Secondary reference for industrial emission sampling and analysis for particulates, (sulfuric acid-acid mists), Patton, W. F. and Brink, J. A., New Equipment and Techniques for Sampling Chemical Process Cases. J. Air Pollution Control Association 13, 162-66 (April 1963).

**Secondary reference for industrial emission sampling and analysis for gases (sulfur trioxide and sulfur dioxide). Determination of Sulfur Dioxide and Sulfur Trioxide in Stack Gases, Emeryville Method Ser. 4S16/59a. Anal. Department Shell Development Company, Emeryville, Calif. (1959).

6. The method of measuring sulfur trioxide and sulfuric acid or any combination thereof suspended in the ambient atmosphere shall be:

Particulates (H_2SO_4)

Ref. Commons, B. T., Tetermination of Particulate Acid in Town Air, Analyst, 88, 364-67 (May 1963).

7. The method of measuring sulfur dioxide in the ambient atmosphere shall be:

Gaseous (SO_2) colorimetric

Ref. Selected Methods for the Measurement of Air Pollutants. Public Health Service Publication No. 99-AP-11 (May 1965), Determination of Sulfur Dioxide: West-Gaeke Method, pp. A-15.

Gaseous (SO_2) conductometric

ASTM Standards on Methods of Atmospheric Sampling and Analysis, 2nd Edition, Method D 1355-60, Method A, Page 11.

8. Other test methods approved by the Executive Secretary may be used. The publications describing methods of measurement specified in this section are hereby made a part of this regulation by reference.

B. Concentration of Sulfur Compounds in Emissions Restricted

1. No person shall cause or permit the emission into the atmosphere from any existing source specified in subsection A (1) of this regulation, gases containing more than 2000 parts per million by volume of sulfur dioxide or 500 parts per million by volume of sulfur dioxide from any new source.

2. No person shall cause or permit the emission into the atmosphere from any source specified in subsection A (1) of this regulation, gases containing more than 70 milligrams per cubic meter of sulfuric acid or sulfur trioxide or any combination thereof or 35 milligrams per cubic meter of sulfuric acid, sulfur trioxide or any combination thereof from any new source (expressed as sulfuric acid).

C. Emission of Sulfur Compounds in Certain Amounts and Manner Restricted

1. No person shall cause or permit the emission of sulfur dioxide from any premises in such manner and amounts that the concentrations and frequencies attributable to such emission exceed those shown in the following table in the ambient air at any occupied place beyond the premises on which the source is located:

Concentration[a]	Averaging Time	Maximum allowable frequency
0.25 ppm or more	5 minutes	Once in any 8 hours
0.10 ppm or more	1 hour	Once in any 4 days
0.05 ppm or more	24 hours	Once in any 90 days

[a] parts per million by volume.

2. No person shall cause or permit the emission of sulfuric acid or sulfur trioxide or any combination thereof from any premises in such manner and amounts that the concentrations and frequencies attributable to such emission exceed those shown in the following table in the ambient air at any place where people live,

work or congregate beyond the premises on which the source is located.

Concentration[a] of sulfuric acid or sulfur trioxide or any combination thereof	Averaging Time	Maximum allowable frequency
0.03 mg/m^3 or more	30 minutes or more	Once in any 48 hours
0.01 mg/m^3 or more	24 hours	Once in any 90 days

[a] Milligrams per cubic meter at standard conditions, measured and calculated as sulfuric acid.

3. No person shall cause or permit the emission of hydrogen sulfide from any premises in such manner and amounts that the concentrations attributable to such emissions in the ambient air at any occupied place beyond the premises on which the source is located exceed a concentration of 0.03 parts per million by volume for any averaging period of 30 or more minutes on more than two occasions in any 5 concecutive day period, or 0.05 parts per million by volume for any averaging period 30 or more minutes more than two times per year.

D. More Restrictive Limitation to Apply

In any situation in which more than one requirement of this regulation is applicable, the most restrictive provision shall govern.

SAN FRANCISCO BAY AREA, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
REGULATION 2
(revised 1962)

DIVISION 3, CHAPTER I

Section 3121 No person shall cause, let, permit, suffer, or allow any emission of sulfur dioxide which results in ground level concentrations of sulfur dioxide at any given point in excess of 1.5 ppm (volume) for 3 consecutive minutes or any of the limits specified in Columns 2, 3, 4, and 5 of Table 1. Section 3121 shall not apply to the ground level concentrations occurring on the property from which such emission occurs, provided such property, from the emission point to the point of any such concentration, is controlled by the person responsible for such emission.

Section 3122 Except as provided in Section 3123, no person shall cause, let, permit, suffer, or allow the emission of gas containing sulfur dioxide in excess of 2000 ppm (volume). All sampling of exhaust gases shall follow the techniques prescribed in Chapter 2, Division 8. For purposes of this section 3122, all sulfur present in gaseous compounds analyses of samples taken to determine the amount of sulfur dioxide in exhaust gases shall be made as specified in Chapter I, Division 9. Tests for determining compliance with this section 3122 shall be for not less than 15 consecutive minutes or 90 percent of the time of actual source operation, whichever is less.

Section 3123 Emissions exceeding the limits established in Section 3122 shall not constitute a violation of that section provided that all requirements of this section 3123, to wit, sections 3123.1 through 3123.9, inclusive, are satisfied.

Section 3123.1 Such emissions shall not result in ground-level concentrations of sulfur dioxide exceeding the limits established by section 3121.

Section 3123.2 The person responsible for such emissions shall have notified the control officer in writing, prior to such emission, of his intent to operate under the provisions of section 3123. Such notice shall include information as to the location of the significant emission points, the location of the monitoring stations specified in sections 3123.3 and 3123.4, and the nature of the source operations related to each such emission.

Section 3123.3 Such person shall provide at least three recording sulfur dioxide monitoring stations located in the area surrounding the source, which stations shall be operated in accordance with the specifications of Chapter 4, Division 8.

Section 3123.4 Such person shall provide at least one recording meteorological station equipped to record wind speed and wind direction.

Section 3123.5 Such person shall provide the necessary care and maintenance services so that the instruments will function properly and adequately record sulfur dioxide exposures in the area.

Section 3123.6 Such person shall provide to the control officer a summary of the data obtained from such instruments during each calendar month. Such summary shall be in such form and detail as will show the degree of compliance with section 3121, and the time, location, extent, and duration of any recorded violation of the provisions of section 3121; shall include data giving the total mass rate of emission of sulfur dioxide from the emission points specified in section 3123.2, and a detailed report of instrument performance and maintenance; and shall be submitted within the calendar month immediately succeeding the recording of the data.

Section 3123.7 Such person shall keep for a period of at least one year all records gathered as a result of this section 3123, and shall make these available to the control officer at his request.

Section 3123.8 Such person shall examine at the time of each instrument maintenance check and in any case at intervals of no greater than every seven days instrument records taken pursuant to the requirements of this section 3123 to determine compliance with Columns 2 and 3, Table 1, section 3121. At intervals no greater than every forty days, such person shall examine such instrument records to determine compliance with Columns 4 and 5, Table 1, section 3121. Any recorded violation of section 3121 shall be reported to the control officer within the next normal working day after such examinations.

Section 3123.9 Whenever the records indicate that a violation of section 3121 has occurred the person responsible for such emission must furnish evidence that proper action has been taken to prevent recurrence, or a violation of section 3123 will be deemed to have occurred and emission will be regulated by section 3122. When instrument records are not adequate to show compliance with section 3121 the control officer may specify the schedule to be followed for producing a satisfactory record history.

TABLE 1

MAXIMUM ALLOWABLE SULFUR DIOXIDE GROUND-LEVEL LIMITS*

Conc. (c)	Total Cumulative Daily Exposure Duration (t) in Hours		Total Cumulative Monthly Exposure Duration (t) in Hours	
	Between Sunrise and Sunset	Between Sunrise and next Succeeding Sunrise	During Hours Between Sunrise and Sunset	Any Time During Month
Column 1	Column 2	Column 3	Column 4	Column 5
1.51 or over	0.05	0.10	1.00	2.00
1.5	0.62	1.24	4.40	8.80
1.4	0.67	1.34	5.10	10.20
1.3	0.73	1.46	5.90	11.80
1.2	0.80	1.60	6.90	13.80
1.1	0.89	1.78	8.30	16.60
1.0	1.00	2.00	10.0	20.00
0.9	1.14	2.28	12.4	24.80
0.8	1.33	2.66	15.6	31.20
0.7	1.60	3.20	20.4	40.80
0.6	2.00	4.00	27.8	55.60
0.5	2.67	5.34	40.0	80.00
0.4	4.00	8.00	62.5	125.00
0.3	8.00	16.00	111.0	222.00
0.2 or less	No limit	No limit	No limit	No limit

*Interpolation of Columns 2, 3, 4, and 5 shall be based on the formulas:

$t = \frac{0.8}{c - 0.2}$, $t = \frac{1.6}{c - 0.2}$, $t = 10/c^2$, and $t = 20/c^2$ respectively;

where c is the concentration of SO_2 in ppm (volume) and t is the time of SO_2 exposure in hours, and c can vary only between a maximum of 1.5 ppm (volume) and a minimum of 0.2 ppm (volume).

COUNTY OF SARASOTA, FLORIDA
AIR POLLUTION CONTROL RESOLUTION
PROHIBITIONS
(effective December 31, 1959)

Section 8 SPECIFIC CONTAMINANTS

No person shall discharge into the atmosphere any one or more of the following contaminants, in any state, or combination thereof exceeding in concentration at the point of discharge:

Sulphur Compounds (calculated as SO_2 0.2 percent by volume).

Solid Products of Combustion 0.4 grains per cubic foot of gas calculated to 12 percent of carbon dioxide (CO_2).

FEDERAL FACILITIES
CFR, TITLE 42, SECTION 76.5 (c)
(effective October 1, 1968)

2. Section 76.5 (c) is amended to read:

(c) (1) Combustion units of all Federal facilities or buildings located in the following areas shall comply with the applicable emission limitations and control measures set out below:

(i) In the New York Standard Consolidated Area, the emission rate of sulfur oxides (calculated as sulfur dioxide) from fuels used in combustion units shall not exceed a maximum emission rate of 0.35 pounds per million Btu (gross value).

(ii) In the Chicago Standard Consolidated Area and in the Philadelphia Standard Metropolitan Statistical Area, the emission rate of sulfur oxides (calculated as sulfur dioxide) from fuels used in combustion units shall not exceed a maximum emission rate of 0.65 pounds per million Btu (gross value).

(2) If compliance with the above emission standard is to be accomplished by means of controlled fuel quality, the agency responsible for each Federal facility in the designated areas shall establish appropriate fuel specifications to insure that the above emission limitations are met and shall provide for adequate tests to ascertain that delivered fuel meets the applicable specifications. If removal of sulfur oxides from flue gases is used to control emissions, the facility shall provide for continuous monitoring and recording of the sulfur oxide content of flue gases emitted. The sulfur content of fuels shall be determined in accordance with current recognized testing procedures of the American Society for Testing Materials. The sulfur content of the flue gases shall be determined in accordance with current recognized testing procedures of the American Society of Mechanical Engineers.

ORGANIC SOLVENT EMISSION CONTROL

AIR POLLUTION CONTROL DISTRICT
COUNTY OF LOS ANGELES (CALIF.)
RULES AND REGULATIONS

RULE 66. (Adopted (7-28-66) ORGANIC SOLVENTS.

a. A person shall not discharge more than 15 pounds of organic materials into the atmosphere in any one day from any article, machine, equipment or other contrivance in which any organic solvent or any material containing organic solvent comes into contact with flame or is baked, heat-cured or heat-polymerized, in the presence of oxygen, unless all organic materials discharged from such article, machine, equipment or other contrivance have been reduced either by at least 85 percent overall or to not more than 15 pounds in any one day.

b. A person shall not discharge more than 40 pounds of organic material into the atmosphere in any one day from any article, machine, equipment or other contrivance used under conditions other than described in section (a), for employing, applying, evaporating or drying any photochemically reactive solvent, as defined in section (k), or material containing such solvent, unless all organic materials discharged from such article, machine, equipment or other contrivance have been reduced either by at least 85 percent overall or to not more than 40 pounds in any one day.

c. Any series of articles, machines, equipment or other contrivances designed for processing a continuously moving sheet, web, strip or wire which is subjected to any combination of operations described in sections (a) or (b) involving any photochemically reactive solvent, as defined in section (k), or material containing such solvent, shall be subject to compliance with section (b). Where only non-photochemically reactive solvents or material containing only non-photochemically reactive solvents are employed or applied, and where any portion or portions of said series of articles, machines, equipment or other contrivances involves operations described in section (a), said portions shall be collectively subject to compliance with section (a).

d. Emissions of organic materials to the atmosphere from the clean-up with photochemically reactive solvent, as defined in section (k), of any article, machine, equipment or other contrivance described in sections (a), (b) or (c), shall be included with the other emissions of organic materials from that article, machine, equipment or other contrivance for determining compliance with this rule.

e. Emissions of organic materials to the atmosphere as a result of spontaneously continuing drying of products for the first 12 hours after their removal from any article, machine, equipment or other contrivance described in sections (a), (b) or (c), shall be included with other emissions of organic materials from that article, machine, equipment or other contrivance for determining compliance with this rule.

f. Emissions of organic materials into the atmosphere required to be controlled by sections (a), (b) or (c), shall be reduced by:

(1) Incineration, provided that 90 percent or more of the carbon in the organic material being incinerated is oxidized to carbon dioxide, or

(2) Adsorption, or

(3) Processing in a manner determined by the Air Pollution Control Officer to be not less effective than (1) or (2) above.

g. A person incinerating, adsorbing, or otherwise processing organic materials pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices as specified in the authority to construct or the permit to operate, or as specified by the Air Pollution Control Officer, for indicating temperatures, pressures, rates of flow or other operating conditions necessary to determine the degree and effectiveness of air pollution control.

h. Any person using organic solvents or any materials containing organic solvents shall supply the Air Pollution Control Officer, upon request and in the manner and form prescribed by him, written evidence of the chemical composition, physical properties and amount consumed for each organic solvent used.

i. The provisions of this rule shall not apply to:

(1) The manufacture of organic solvents, or the transport or storage of organic solvents or materials containing organic solvents.

(2) The use of equipment for which other requirements are specified by Rules 56, 59, 61 or 65 or which are exempt from air pollution control requirements by said rules.

(3) The spraying or other employment of insecticides, pesticides or herbicides.

(4) The employment, application, evaporation or drying of saturated halogenated hydrocarbons or perchloroethylene.

j. For the purposes of this rule, organic solvents include diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers or cleaning agents.

k. For the purposes of this rule, a photochemically reactive solvent is any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent:

(1) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers or ketones having an olefinic or cyclo-olefinic type of unsaturation: 5 percent;

(2) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent;

(3) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

l. For the purposes of this rule, organic materials are defined as chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbonates and ammonium carbonate.

m. This rule shall be effective on the date of its adoption as to any article, machine, equipment or other contrivance, not then completed and put into service. As to all other articles, machines, equipment or other contrivances, this rule shall be effective:

(1) On July 1, 1967, for those emitting 500 pounds or more of organic materials in any one day.

(2) On October 1, 1967, for those emitting 100 pounds or more but less than 500 pounds of organic materials in any one day.

(3) On March 1, 1968, for those subject to compliance with section (a), and emitting 15 pounds or more but less than 100 pounds of organic materials in any one day, and for those subject to compliance with section (b), and emitting 40 pounds or more but less than 100 pounds in any one day.

RULE 66.1 (Adopted 7-28-66) ARCHITECTURAL COATINGS.
a. After July 1, 1967, a person shall not sell or offer for sale for use in Los Angeles County, in containers of one quart capacity or larger, any architectural coating containing photochemically reactive solvent, as defined in Rule 66 (k).

b. After July 1, 1967, a person shall not employ, apply, evaporate or dry in Los Angeles County any architectural coating purchased in containers of one quart capacity or larger, containing photochemically reactive solvent, as defined in Rule 66(k).

c. After July 1, 1967, a person shall not thin or dilute any architectural coating with a photochemically reactive solvent, as defined in Rule 66(k).

d. For the purposes of this rule, an architectural coating is defined as a coating used for residential or commercial buildings and their appurtenances; or industrial buildings.

RULE 66.2 (Adopted 7-28-66) DISPOSAL AND EVAPORATION OF SOLVENTS.
A person shall not during any one day dispose of a total of more than 1-1/2 gallons of any photochemically reactive solvent, as defined in Rule 66(k), or of any material containing more than 1-1/2 gallons of any such photochemically reactive solvent by any means which will permit the evaporation of such solvent into the atmosphere.

SAN FRANCISCO BAY AREA
AIR POLLUTION CONTROL DISTRICT
REGULATION 3
(adopted January 4, 1967)

DIVISION 3 - GENERAL LIMITATIONS AND REQUIREMENTS

Section 3000. This division applies to all source operations unless such source operation is excluded under Chapter 2, Division 1, of this Regulation.

CHAPTER 1 - GENERAL LIMITATIONS

Section 3101. Except as otherwise provided in Chapter 2, Division 1, and Chapters 1 and 3, Division 3, no person shall cause, let, permit suffer or allow, an emission of an effluent containing a concentration of more than 50 ppm of organic compounds calculated as hexane (or 300 ppm total "carbon").

Section 3102. Compliance with any sections 3102.1 through 3102.6 shall be deemed to be in compliance with Section 3101. Showing of such compliance by the person responsible for an organic gas emission shall include applicable portions and/or calculation procedures contained in API Bulletin 2514, "Evaporation Loss from Tank Cars, Tank Trucks and Marine Vessels," in API Bulletin 2517, "Evaporation Loss from Floating Roof Tanks," and API Bulletin 2518, "Evaporation Loss from Fixed Roof Tanks."

Section 3102.1. Organic gas emissions from a stationary storage tank of equal to or less than 1,000 barrels capacity and containing organic liquids with a vapor pressure greater than 1.5 psia under actual storage conditions, and a head space reactivity greater than 5% shall not exceed that rate at which organic gases would be emitted if the tank were filled through a submerged fill pipe.

Section 3102.2. Organic gas emissions calculated as a liquid from a facility loading more than 25,000 gallons per calendar day of organic liquids with a Reid vapor pressure greater than 4 and a head space reactivity greater than 5% into transportable containers larger than 100 gallons capacity shall not exceed 0.01% of the volume loaded.

Section 3102.3. Organic gas emissions from a facility loading between 500 and 25,000 gallons per calendar day of organic liquids with a Reid vapor pressure greater than 4 and a head space reactivity greater than 5% into transportable containers larger than 10 gallons capacity shall not exceed that amount which would be emitted if the containers were filled through a submerged fill pipe.

Section 3102.4. Organic gas emissions from a stationary storage tank which has a storage capacity greater than 1,000 barrels, and which contains organic liquid having a vapor pressure under actual storage conditions greater than 1.5 psia but equal to or less than 11 psia and a head space reactivity greater than 5%, shall not exceed that amount of organic gas emission which the same tank, containing the same organic liquid, would emit if equipped with a floating roof in good condition. Such organic gas emissions shall be calculated according to API Bulletin 2517, "Evaporation Loss from Floating Roof Tanks," or shall be calculated by applicable procedures acceptable to the Control Officer where API Bulletin 2517 procedures are not valid.

Section 3102.5. Organic gas emissions from a stationary storage tank which has storage capacity greater than 1,000 barrels and which contains organic liquid having a vapor pressure under actual storage conditions greater than 11.0 psia and a head space reactivity greater than 5%, shall not exceed that amount of organic gas emission which the same tank, containing the same organic liquid, would emit if it were storing an organic liquid of 11 psia vapor pressure and were equipped with a floating roof in good condition. Such organic gas emission shall be calculated according to API Bulletin 2517, "Evaporation Loss from Floating Roof Tanks," or shall be calculated by applicable procedures acceptable to the Control Officer in cases where API Bulletin 2517 procedures are not valid.

Section 3102.6. Organic gas emissions, calculated as a liquid, from an oil-water separator processing more than 200 gallons per calendar day of organic liquid having a temperature of 401°F or less at the 10% point recovered when distilled by ASTM Method D86-56, and having a head space reactivity greater than 5%, shall not exceed 0.2% of the volume of organic liquid recovered by the oil-water separator.

Section 3103. Except as provided in section 3103.1 or 3103.2, no person shall sell, or offer for sale, for delivery to a buyer for use within the Bay Area Air Pollution Control District, in containers of one quart capacity or larger, any surface coating or organic solvent that does not meet the requirements of a complying surface coating or a complying solvent.

Section 3103.1. Surface coatings or solvents which are held for sale or shipment to an industrial user are exempt from the provisions of Section 3103 provided the seller submits to the Bay Area Air Pollution Control District the names and addresses of customers who make unit purchases of surface coatings or solvents other than complying surface coatings or complying solvents in 55 gallon drums, in larger containers, or in bulk, within the Bay Area Air Pollution Control District. Information disclosed to the Bay Area Air Pollution Control District by sellers pursuant to this section shall be treated as "official information" pursuant to Evidence Code, Section 1040.

Section 3103.2. Organic solvents which are held for sale or shipment to a user and which are formulated for dilution by the user prior to use or application so that the final product as diluted will be a complying solvent, are exempt from the provisions of Section 3103, provided that labeling is to that effect.

Section 3103.3. No person shall, without meeting the limitations and requirements of this Regulation, employ, use, apply, evaporate, or dry any surface coating or organic solvent purchased in containers of one quart capacity or larger, unless the surface coating or solvent is in compliance with the standards for a complying surface coating or a complying solvent.

Section 3103.4. No person, shall, without meeting the limitations and requirements of this Regulation, thin or dilute any paint, lacquer, varnish, ink, adhesive, or other surface coating material or any organic solvent with any material so that after dilution it will not be a complying surface coating or a complying solvent; provided that this section shall not apply to an industrial user using complying industrial surface coating, nor to the manufacture of paint, lacquer, varnish, ink, adhesive, or other surface coating material or to the manufacture of solvent.

Section 3103.5. A person who uses in an operation only complying surface coating, or complying solvent, or an industrial user who uses in an operation only complying industrial surface coating is not required to meet the requirements of Sections 3101 and 3103.3 for that operation. This Section shall not apply to the use of surface coating where heat is applied if emissions from such use contain more than 5 ppm of aldehydes expressed as formaldehyde.

Section 3103.6. A label or mark placed on the container by the manufacturer that a surface coating or an organic solvent is a complying surface coating, a complying industrial surface coating, or a complying solvent within the meaning of this Regulation shall be prima facie evidence of that fact stated in the label or mark.

HYDROCARBON EMISSION CONTROL

COUNTY OF LOS ANGELES, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION IV - PROHIBITIONS
(amended June 1, 1965)

RULE 56. (Amended 1-16-58) STORAGE OF PETROLEUM PRODUCTS.
A person shall not place, store or hold in any stationary tank, reservoir or other container of more than 40,000 gallons capacity any gasoline or any petroleum distillate having a vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions, unless such tank, reservoir or other container is a pressure tank maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:*

a. A floating roof, consisting of a pontoon-type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the gasoline or petroleum distillate has a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

b. A vapor recovery system, consisting of a vapor-gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor-disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

c. Other equipment of equal efficiency, provided such equipment is submitted to and approved by the Air Pollution Control Officer.

RULE 59. (Amended 1-16-58) OIL EFFLUENT WATER SEPARATOR.
A person shall not use any compartment of any single or multiple oil-effluent water separator which compartment receives effluent water containing 200 gallons a day or more of any petroleum product or mixture of petroleum products from any equipment processing, refining, treating, storing or handling kerosine or other petroleum product of equal or greater volatility than kerosine, unless such compartment is equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

a. A solid cover with all openings sealed and totally enclosing the liquid contents. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

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*Jefferson County, Kentucky, uses this portion of the Los Angeles Code.

b. A floating roof, consisting of a pontoon-type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and container wall. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

c. A vapor recovery system, consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

d. Other equipment of equal efficiency, provided such equipment is submitted to and approved by the Air Pollution Control Officer.

This rule shall not apply to any oil-effluent water separator used exclusively in conjunction with the production of crude oil.

For the purpose of this rule, "kerosine" is defined as any petroleum product which, when distilled by ASTM standard test Method D 86-56, will give a temperature of 401°F or less at the 10 percent point recovered.

RULE 61. (Amended 3-14-63) GASOLINE LOADING INTO TANK TRUCKS AND TRAILERS. A person shall not load gasoline into any tank or trailer from any loading facility unless such loading facility is equipped with a vapor collection and disposal system or its equivalent, properly installed, in good working order and in operation.

When loading is effected through the hatches of a tank truck or trailer with a loading arm equipped with a vapor-collecting adaptor, a pneumatic, hydraulic or other mechanical means shall be provided to force a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid gasoline drainage from the loading device when it is removed from the hatch of any tank truck or trailer, or to accomplish complete drainage before such removal.

When loading is effected through means other than hatches, all loading and vapor lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

The vapor disposal portion of the system shall consist of one of the following:

a. A vapor-liquid absorber system with a minimum recovery efficiency of 90 percent by weight of all the hydrocarbon vapors and gases entering such disposal system.

b. A variable vapor space tank, compressor, and fuel gas system of sufficient capacity to receive all hydrocarbon vapors and gases displaced from the tank trucks and trailers being loaded.

c. (Amended 3-14-63) Other equipment of at least 90 percent efficiency, provided such equipment is submitted to and approved by the Air Pollution Control Officer.

This rule shall not apply to the loading of gasoline into tank trucks and trailers from any loading facility from which not more than 20,000 gallons of gasoline are loaded in any one day.

For the purpose of this rule, any petroleum distillate having a Reid vapor pressure of four pounds or greater shall be included by the term "gasoline."

(Amended 12-4-58) For the purpose of this rule, "loading facility" means any aggregation or combination of gasoline loading equipment which is both (1) possessed by one person, and (2) located so that all the gasoline loading outlets for such aggregation or combination of loading equipment can be encompassed within any circle of 300 feet in diameter.

RULE 65. (Amended 6-1-65) GASOLINE LOADING INTO TANKS.

A person shall not after January 1, 1965, load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in Rule 56, or is a pressure tank as described in Rule 56.

The provisions of the first paragraph of this rule shall not apply to the loading of gasoline into any tank having a capacity of less than 2,000 gallons which was installed prior to the date of adoption of this rule nor to any underground tank installed prior to the date of adoption of this rule where the fill line between the fill connection and tank is offset.

Any person operating or using any gasoline tank with a capacity of 250 gallons or more installed prior to the date of adoption of this rule shall apply for a permit to operate such tank before January 1, 1965. The provisions of Rule 40 shall not apply during the period between the date of adoption of this rule and January 1, 1965, to any gasoline tank installed prior to the date of adoption of this rule provided an application for permit to operate is filed before January 1, 1965.

A person shall not install any gasoline tank with a capacity of 250 gallons or more unless such tank is equipped as described in the first paragraph of this rule.

For the purpose of this rule, the term "gasoline" is defined as any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

For the purpose of this rule, the term "submerged fill pipe" is defined as any fill pipe the discharge opening of which is entirely submerged when the liquid level is 6 inches above the bottom of the tank. "Submerged fill pipe" when applied to a tank which is loaded from the side is defined as any fill pipe the discharge opening of which is entirely submerged when the liquid level is 18 inches above the bottom of the tank.

(Adopted 6-1-65) The provisions of this rule do not apply to any stationary tank which is used primarily for the fueling of implements of husbandry, as such vehicles are defined in Division 16 (Section 36000, et seq.) of the Vehicle Code.

COUNTY OF SAN BERNARDINO, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
RULES AND REGULATIONS
REGULATION III
(adopted August 5, 1958)

RULE 3:7 STORAGE OF PETROLEUM PRODUCTS. A person shall not place, store or hold in any stationary tank reservoir or other container of more than 40,000 gallons capacity any gasoline or any petroleum distillate having a vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions, unless such tank, reservoir or other container is a pressure tank maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

(a) A floating roof, consisting of a pontoon-type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the gasoline or petroleum distillate has a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

(b) A vapor recovery system, consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

(c) Other equipment of equal efficiency, provided such equipment is submitted to and approved by the Air Pollution Control Officer.

FEDERAL FACILITIES
CFR, TITLE 42, SECTION 76.7
(effective October 1, 1968)

§ 76.7 Storage and handling of fuels and ash.

(a) Solid fuels and ash shall be stored and handled so as not to release to the atmosphere dust in significant quantities.

(b) In quantities of 40,000 gallons or more, gasoline or any volatile petroleum distillate or organic liquid having a vapor pressure of 1.5 p.s.i.a. or greater under actual storage conditions shall be stored in pressure tanks or reservoirs or shall be stored in containers equipped with a floating roof or vapor recovery system or other vapor emission control device.

(c) Stationary gasoline storage tanks with a capacity of 250 gallons or more shall be equipped with either submerged filling inlets or with vapor recovery or emission control systems such that loss of vapor to the atmosphere during filling operations shall be minimized.

(d) Gasoline or petroleum distillate tank car or tank truck loading facilities handling 20,000 gallons per day or more shall be equipped with submersible filling arms or other vapor emission control systems.

AIR POLLUTION CONTROL REGULATION FOR
ST. LOUIS METROPOLITAN AREA

(adopted February 22, 1967, by
Missouri Air Conservation Commission)

REGULATION XXI REQUIREMENTS FOR CONSTRUCTION OF NEW GASOLINE STORAGE FACILITIES

A. General

1. For purposes of this regulation, the term "gasoline" is defined as petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

2. For purposes of this regulation, the term "submerged fill pipe" is defined as any fill pipe the discharge opening of which is entirely submerged when the liquid level is 6 inches above the bottom of the tank. "Submerged fill pipe" when applied to a tank which is loaded from the side is defined as any fill pipe the discharge opening of which is entirely submerged when the liquid level is 18 inches above the bottom of the tank.

B. Petroleum Storage Tanks

1. After the effective date of this regulation, no person shall build or install or permit the building or installation of any stationary tank, reservoir or other container of more than 40,000 gallons capacity which will or might be used for storage of any petroleum distillate having a vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions, unless such tank, reservoir or other container is to be a pressure tank capable of maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere or is designed, and will be built, and equipped with one of the following vapor loss control devices:

   a. A floating roof, consisting of a pontoon type or double deck type roof, which will rest on the surface of the liquid contents and be equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment to be provided for in this subsection B (1) shall not be permitted if the gasoline or petroleum distillate to be stored will have a vapor pressure of 12.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be built so as to be gas-tight except when gauging or sampling is to take place.

   b. A vapor recovery system consisting of a vapor-gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

   c. Other equipment or means of equal efficiency for purposes of air pollution control as may be approved by the Executive Secretary.

C. Submerged Fill Pipes Required

1. After the effective date of this regulation, no person shall build or install or permit the building or installation of a stationary gasoline storage tank with a capacity of 250 gallons or more unless such tank is equipped with a permanent submerged fill pipe or is a pressure tank as described in subsection B (1) of this regulation, or is fitted with a vapor recovery system as described in subsection B (1)(b) of this regulation.

SAN FRANCISCO BAY AREA, CALIFORNIA
AIR POLLUTION CONTROL DISTRICT
REGULATION 2
(revised 1962)

Division 4, Chapter 1

Section 4113 HYDROCARBONS AND CARBONYLS. No person shall cause, let, permit, suffer, or allow the emission from any incineration operation or salvage operation of an exhaust gas containing a concentration of more than 50 ppm (vol) of total hydrocarbons, or a concentration of more than 50 ppm (vol) of total carbonyls. For purposes of this section 4113, the actual measured concentrations of hydrocarbons and carbonyls in the exhaust gas shall be corrected to concentrations which the same quantities of hydrocarbons and carbonyls would constitute in the exhaust gas minus water vapor, corrected to standard conditions, containing 6% oxygen by volume, and as if no auxiliary fuel has been used. Calculation of this corrected concentration from the actual measured concentration shall be as given in Chapter 1, Division 8. For the purposes of this section 4113, total hydrocarbons shall be the sum of the concentrations in ppm (vol) of the individual concentrations of C_2 and higher saturated and unsaturated hydrocarbons, as measured by gas chromatography as described in Chapter 4, Division 9. Total carbonyls shall include aldehydes and ketones determined as described in Chapter 5, Division 9, and calculated as formaldehyde, each carbonyl group being deemed equivalent to one molecule of formaldehyde. Tests for determining compliance with this section 4113 shall be for not less than 15 consecutive minutes or 90% of the time of actual source operation, whichever is less.

FLUORIDE EMISSION CONTROL

STATE OF FLORIDA
AIR POLLUTION CONTROL
COMMISSION RULES
CHAPTER 170C-9.06(3)
(revised October 6, 1965)

(3) Fluoride Emissions. Unit emissions of fluoride, expressed as pounds of fluoride per ton of P_2O_5 or equivalent, shall not exceed 0.4 (four-tenths) pounds, taking into consideration the following:

(a) Latest advances in the technology of air pollution control.

(b) The lowest value attained by any operating plant manufacturing similar products.

(c) Existing levels of air pollution in the state.

(d) Location of installation.

The allowable emission of fluorides shall be calculated by multiplying the unit emission specified above times the expressed design production capacity of the installation or plant. Allowable emissions shall be set as low as possible consistent with the above factors.

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MOTOR VEHICLE EMISSION CONTROL*

CITY OF TOLEDO, OHIO
RULES AND REGULATIONS OF THE
DIVISION OF AIR AND WATER POLLUTION CONTROL
TO GOVERN MOTOR VEHICLE OPERATION

1. NO MOTOR VEHICLE shall be operated which emits visible smoke while moving for a distance of more than 100 yards, upon the street, roads or highways of the City.

2. THE OPERATOR shall not permit the gasoline or diesel engine of his motor vehicle to discharge visible or noxious fumes for more than 3 minutes while the vehicle is stationary upon the street, truck stop, parking area, or at a route terminal.

3. PERSONS LIABLE. All persons owning, operating or in charge of control of any equipment who shall cause or permit or participate in any violation of these rules and regulations either as owner, operator, lessee or lessor shall be individually and collectively liable for any penalties imposed by Article 60 of the Toledo Municipal Code covering the Regulation and Control of Air and Water Pollution Control.

4. PROSECUTION AND FINES. Prosecutions under this ordinance shall be instituted by the Commissioner of Air and Water Pollution Control and shall be prosecuted in the name of the City of Toledo.

5. ANY PERSON upon conviction of violating any one of the provisions of this ordinance shall be liable to a fine of not less than $25.00 nor more than $100.00

PASSED BY THE AIR AND WATER POLLUTION CONTROL ADVISORY BOARD
SEPTEMBER 9, 1965

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*Reference: Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines. Federal Register, Vol. 33, No. 2, Part II. January 4, 1968. DHEW.

ORDINANCE
OF THE
CITY OF NEWARK, NEW JERSEY
(effective November 7, 1958)

Section 14.1. No motor vehicle shall be operated which causes a nuisance by emitting unreasonable or excessive smoke, gases, vapors or fumes while stationary or while moving for a distance of more than one hundred (100) yards anywhere within the City.

Section 14.2. No gasoline or diesel fueled bus shall be permitted to operate, discharging air polluting gases for more than three (3) minutes while stationary at a route terminal.

Section 14.3. No gasoline-fueled bus picking up or discharging passengers at other than terminals shall be operated after one (1) year after the effective date of this Ordinance, unless it is equipped with a device to minimize the deposit or gasoline in the intake passages and manifold of the engines while decelerating. Such devices shall be approved by the Chief.

Section 14.4. No motor vehicle, except as hereinafter provided which uses gasoline or diesel fuel and discharges the exhaust caused by the combustion of such fuel into the open air through a vertical exhaust pipe, shall be operated upon the streets, roads and highways of this City after one (1) year following the effective date of this Ordinance. Provided, however, that subject to approval by the Chief, vertical exhaust pipes may be used on motor vehicles where the use of horizontal exhaust pipes would endanger the safety of the operators or occupants of such motor vehicles.

MUNICIPAL CODE OF CHICAGO
RELATING TO
AIR POLLUTION CONTROL
CHAPTER 17
(as amended January 1, 1966)

SMOKE AND GASES FROM INTERNAL COMBUSTION ENGINES OF VEHICLES.

17-32. No person shall operate, or cause to be operated, upon any street, highway, public place, stream or waterway, or private premises within the City of Chicago, any internal combustion engines of any motor vehicle, boat, tug or other vehicle, while stationary or moving, which emits from any source any unreasonable and excessive smoke, obnoxious or noxious gases, fumes, or vapor; provided the foregoing shall not apply to the operation of aircraft of municipal airports.

STATE OF CALIFORNIA STANDARDS
FOR MOTOR VEHICLE EMISSIONS

(revised by the California State Board of
Public Health, March 1967)

DEFINITION OF TERMS

EXHAUST EMISSIONS -- Exhaust emissions are defined as substances emitted to the atmosphere from any opening downstream from the exhaust manifold of a motor vehicle engine.

CRANKCASE EMISSIONS -- Crankcase emissions are defined as substances emitted directly to the atmosphere from any opening leading to the crankcase of a motor vehicle engine. Crankcase gases which are conducted to the engine intake or exhaust system are not included in the definition of crankcase emissions, but are defined as exhaust emissions.

CARBURETOR EMISSIONS

Carburetor Operating Losses -- Carburetor operating losses are defined as the vaporized fuel emitted from the carburetor of a motor vehicle engine to the atmosphere while the engine is operating.

Carburetor Hot Soak Losses -- Carburetor hot soak losses are defined as the vaporized fuel emitted from the carburetor of a motor vehicle engine to the atmosphere during the hot soak period, i.e., the period which begins immediately after the engine is turned off.

FUEL TANK EMISSIONS -- Fuel tank emissions are defined as the vaporized fuel which escapes to the atmosphere from the fuel tank of a motor vehicle except during tank filling.

30520. EXHAUST EMISSIONS

(a) The standards of emissions of motor vehicle exhaust contaminants are:

(1) Vehicles with engine displacement of 50 to 100 cubic inches:
Hydrocarbons - 410 parts per million by volume as hexane.
Carbon Monoxide - 2.3 percent by volume.

(2) Vehicles with engine displacement of 101 to 140 cubic inches:
Hydrocarbons - 350 parts per million by volume as hexane.
Carbon Monoxide - 2.0 percent by volume.

(3) Vehicles with engine displacement above 140 cubic inches:
Hydrocarbons - 275 parts per million by volume as hexane.
Carbon Monoxide - 1.5 percent by volume.

(4) Oxides of Nitrogen - 350 parts per million by volume as nitrogen dioxide, for all engine displacements.

(b) Exhaust gas concentrations shall be adjusted to a dry exhaust volume containing 15 percent by volume of carbon dioxide plus carbon monoxide. However, effective January 1, 1970, the exhaust gas concentrations shall be adjusted by the ratio of $15/\ [1-2(\%CO) + \%CO_2 + 10(\%\text{Hydrocarbon})]$.

(c) Hydrocarbons are defined as the organic constituents of vehicle exhaust as measured by a hexane-sensitized nondispersive, infrared analyzer or by an equivalent method.[1]

(d) Carbon monoxide shall be measured by a nondispersive infrared analyzer or by an equivalent method.

(e) Oxides of nitrogen shall be measured by the phenoldisulfonic acid method or by an equivalent method.

(f) The standards refer to a composite sample representing the driving cycle described as follows:

TABLE I[2]

Condition	Rate of Speed Change mph/sec.	Percent of Total Time	Percent of Total Sample Volume
Idle --------	--	15.0	4.2
Cruise			
20 mph ------	--	6.9	5.0
30 mph ------	--	5.7	6.1
40 mph ------	--	2.7	4.2
50 mph ------	--	0.7	1.5
Acceleration			
0-60 mph ---	3.0	1.1	5.9
0-25 mph ---	2.2	10.6	18.5
15-30 mph ---	1.2	25.0	45.5
Deceleration			
50-20 mph ---	1.2	10.2	2.9
30-15 mph ---	1.4	11.8	3.3
30- 0 mph ---	2.5	10.3	2.9
		100.0	100.0

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[1] Some hydrocarbons, for example methane, ethane, propane, n-butane and acetylene, are not considered sufficiently reactive to produce photochemical smog effects. The Department is working on methods which measure the reactive organic compounds in exhaust and will restate the hydrocarbon standard in terms of reactive hydrocarbons when methods and data satisfactory to the Department are developed.

[2] If other test cycles are used, they must represent urban driving and the emissions must be relatable to the composite sample from the driving modes described in Table I.

CRANKCASE EMISSIONS

The standard for motor vehicle crankcase emissions is:

Hydrocarbons - 0.1 percent by weight of the supplied fuel.

The standard refers to a composite sample representing the modes of engine operation described as follows:

Mode of Operation	Percent of Total Time
Idle	19
30 mph - 16 inch mercury manifold vacuum	37
30 mph - 10 inch mercury manifold vacuum	11
30 mph - 2 inch mercury manifold vacuum	8
Deceleration	25

FUEL TANK EMISSIONS

The standard for fuel tank emissions is:

Hydrocarbons - 6 grams per day[*]

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[*] The standard refers to emissions in a 24-hour day when the minimum temperature is 60°F. and the maximum is 90°F., and when the fuel tank is between one-fourth and one-half full, averaging three-eighths full. The standard was developed from data obtained when fuels averaging a Reid Vapor Pressure of approximately 9 were used, and when hydrocarbon emissions were collected in condensing traps at dry ice temperature. Equivalent methods and other conditions may be used if approved by the Department of Public Health.

CARBURETOR HOT SOAK EMISSIONS

The standard for carburetor hot soak emissions is:

Hydrocarbons - 2 grams per soak[*]

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[*] The standard refers to emissions from the carburetor of an automotive engine operated to an equilibrium coolant temperature of 180°F. minimum and when the ambient air temperature is from 85 to 95°F. minimum. The soak duration is one hour. The standard was developed from data obtained when fuels averaging a Reid Vapor Pressure of approximately 9 were used in the test vehicles, and when hydrocarbon emissions were collected in condensing traps at dry ice temperature. Equivalent methods and other conditions may be used if approved by the Department of Public Health.

SMOKE EMISSIONS

The standard for smoke emitted from a motor vehicle is:

a. The shade, or the equivalent opacity of the shade,[*] designated as No. 1 on the Ringelmann Chart;[**] or

b. The shade, or equivalent opacity of the shade, designated as Ringelmann No. 2, if the smoke is for a period not exceeding five seconds at a time.

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[*] Equivalent opacity is defined as the obscuration to an observer's view produced by smoke of any color that is equal to an obscuration by smoke of a shade specified in the Ringelmann Smoke Chart, published by the U. S. Bureau of Mines.

[**] As published by the U. S. Bureau of Mines, Information Circular 7719, August, 1955.

STATE OF NEW YORK
DEPARTMENT OF HEALTH
AIR POLLUTION CONTROL BOARD
(adopted March 22, 1963)

CRITERIA*

1. The crankcase ventilation system shall prevent the emission to the atmosphere of at least 80% of the blowby shown as the 6th population decile in Table 1.
2. The crankcase ventilation system shall be so designed that it will have no adverse effect on engine operation or vehicle performance.
3. The crankcase ventilation system shall not cause oil loss from the crankcase.
4. The crankcase ventilation system shall operate in a safe manner.
5. The crankcase ventilation system must operate in such a manner so as not to create excessive heat, noise, or odor.
6. Installation of the crankcase ventilation system shall not contribute to a noxious or toxic effect in the ambient air.
7. The crankcase ventilation system shall be constructed of materials adequate for preventing corrosion, erosion, fatigue, and wear, and must be thermally stable under the conditions of use and be resistant to gasoline, oil, and other materials present in engines and ambient air (including ozone and oxides of nitrogen) so as to assure durability.
8. The crankcase ventilation system shall operate efficiently for a minimum of 12,000 miles with normal maintenance.

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* Summarized herein. More extensive material is included in the full criteria.

TABLE 1

Engine Class[b]	Test Condition	Formula Air ACFM[a] @ 110°F 30" Hg	Formula Blowby ACFM[a] 110°F, 30" Hg (For 6th population decile)
a	Idle	--	0.13
	16"	10	0.32
	10"	15	0.49
	2"	23	0.72
b	Idle	--	0.27
	16"	23	0.62
	10"	37	0.96
	2"	55	1.41
c	Idle	--	0.57
	16"	30	1.25
	10"	47	1.93
	2"	71	2.84
d	Idle	--	0.80
	16"	36	1.89
	10"	57	2.91
	2"	86	4.29
e	Idle	--	0.65
	16"	45	1.71
	10"	70	2.64
	2"	104	3.88
f	Idle	--	0.48
	16"	53	1.48
	10"	82	2.30
	2"	122	3.38

3/22/63

[a] Average CFM

[b] See attached Table 2 for engine class description

TABLE 2

Class	Engine Displacement
a	Under 140 cubic inches
b	140 - 200 cubic inches
c	200 - 250 cubic inches
d	250 - 300 cubic inches
e	300 - 375 cubic inches
f	Over 375
g	Motor vehicles which, because of unusual engine design, require special crankcase emission controls regardless of engine displacement.

ODOR EMISSION CONTROL

See "Zoning Ordinance" section of this report
for more effective means of odor control.

CITY OF CHICAGO, ILLINOIS
AIR POLLUTION CODE
CHAPTER 17
(amended January 1, 1965)

17-26. It shall be unlawful within the City of Chicago and within one mile of the corporate limits for any person, owner, agent, operator, firm or corporation to permit to cause, suffer or allow the discharge, emission or release into the atmosphere from any source whatsoever of such quantities of soot, fly ash, dust, cinders, dirt, oxides, gases, vapors, odors, toxic or radioactive substances, waste, particulate, solid, liquid or gaseous matter or any other materials in such place, manner or concentration as to constitute atmospheric pollution. *(Amend. Coun. J. 7-1-63, p. 579.)

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*Atmospheric pollution is defined as the discharging from stacks, chimneys, exhausts, vents, ducts, openings, buildings, structures, premises, open fires, portable boilers, vehicles, processes or any source, of any smoke, soot, fly ash, dust, cinders, dirt, noxious or obnoxious acids, fumes, oxides, gases, vapors, odors, toxic or radioactive substances, waste, particulate, solid, liquid or gaseous matter, or any other materials in such place, manner or concentration as to cause injury, detriment, nuisance, or annoyance to the public, or to endanger the health, comfort, repose, safety or welfare of the public, or in such a manner as to cause or have a natural tendency to cause injury or damage to business or property.

CITY OF CLEVELAND, OHIO
AIR POLLUTION CODE
ORDINANCE NO. 428 - A - 62
(effective June 20, 1962)

Section 4.0507. NUISANCE--GASES, FUMES AND OTHER POLLUTION.

No owner, occupant or person in charge, by himself, his agent or employee, shall cause, suffer or allow the emission of poisonous, obnoxious, pungent or ill smelling gases, fumes or other air pollutants from any stack or from any other source in the City of Cleveland so as to cause a nuisance. Such nuisance may be summarily abated by the Commissioner of Air and Stream Pollution or his duly authorized representative. Such abatement shall be in addition to the penalty hereinafter provided.

AIR POLLUTION CONTROL REGULATIONS FOR ST. LOUIS METROPOLITAN AREA

(adopted February 22, 1967, by Missouri Air Convervation Commission)

Regulation XV CONTROL OF ODORS IN THE AMBIENT AIR

A. No person shall emit odorous matter such as to cause an objectionable odor

1. on or adjacent to residential, recreational, institutional, retail sales, hotel or educational premises,
2. on or adjacent to industrial premises when air containing such odorous matter is diluted with 20 or more volumes of odor-free air,
3. on or adjacent to premises other than those in 1 and 2 when air containing such odorous matter is diluted with four or more volumes of odor-free air.

B. The above requirement shall apply only to objectionable odors. An odor will be deemed objectionable when 30 percent or more of a sample of the people exposed to it believe it to be objectionable in usual places of occupancy, the sample size to be at least 20 people or 75 percent of those exposed if fewer than 20 people are exposed.

Regulation XVI CONTROL OF ODORS FROM PROCESSING OF ANIMAL MATTER

A. General

1. For purposes of this regulation the word "reduction" is defined as any heated process, including rendering, cooking, drying, dehydrating, digesting, evaporating, and protein concentrating. Animal matter is defined as any product or derivative of animal life.

2. The provisions of this regulation shall not apply to any device, machine, equipment, or other contrivance used exclusively for the processing of food for human consumption in food service establishments.

For purposes of this regulation a food service establishment shall be defined as follows: Any fixed or mobile restaurant; coffee shop; cafeteria; short order cafe; luncheonette; grill; tearoom; sandwich shop; soda fountain; tavern; bar; cocktail lounge; night club; roadside stand; industrial feeding establishment; private, public or nonprofit organization or institution routinely serving food; catering kitchen, commissary, or similar place in which food or drink is placed for sale or for service on the premises or elsewhere; and any other eating or drinking establishment or operation where food is served or provided for the public with or without charge.

B. Odor Control Equipment Required on Reduction Processes

1. No person shall operate or use any device, machine equipment or other contrivance for the reduction of animal matter unless all gases, vapors, and gas-entrained effluents from such facility are incinerated at a temperature of not less than 1200 degrees Fahrenheit for a period of not less than 0.3 second, or processed in such manner as determined by the Executive Secretary to be equally or more effective for the purpose of air pollution control.

A person incinerating or processing gases, vapors or gas-entrained effluents pursuant to this rule shall provide, properly install and maintain, in good working order and in operation, devices as specified by the Executive Secretary for indicating temperature, pressure, or other operating conditions.

C. Other Odor Control Measures Required

1. Effective devices and/or measures shall be installed and operated such that no vent, exhaust pipe, blow-off pipe or opening of any kind shall discharge into the outdoor air any odorous matter, vapors, gases, or dusts or any combination thereof which create odors or other nuisances in the neighborhood of the plant.

2. Odor producing materials shall be stored and handled in a manner such that odors produced from such materials are confined. Accumulation of odor producing materials resulting from spillage or other escape is prohibited.

3. Odor bearing gases, vapors, fumes, or dusts arising from materials in process shall be confined at the point of origin so as to prevent liberation of odorous matter. Confined gases, vapors, fumes, or dusts shall be treated before discharge to the atmosphere, as required in subsection C (1).

D. Enclosure of Building May Be Required

Whenever dust, fumes, gases, mist, odorous matter, vapors, or any combination thereof escape from a building used for processing of animal matter in such manner and amount as to cause a violation of Regulation XV, the Executive Secretary may order that the building or buildings in which processing, handling and storage are done be tightly closed and ventilated in such a way that all air and gases and air or gas-borne material leaving the building are treated by incineration or other effective means for removal or destruction of odorous matter or other air contaminants before discharge into the open air.

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ZONING ORDINANCES
(INCORPORATES SMOKE DENSITY ,ODOR, AND PARTICULATE CONTROL)

CITY OF BELOIT, WISCONSIN
CITY PLANNING AND ZONING
CHAPTER X
(revised April 25, 1962)

Section 10.08: M-1 and M-2 INDUSTRIAL DISTRICTS:

In the M-1 and M-2 Industrial Districts all Commercial and Industrial uses permitted shall comply with the following table of standards and requirements:

1. Nuisance Standards:
   A. Air Pollution
      1. Smoke, fumes, mist, vapor similar air contaminant from any source whatsoever shall not be discharged into the atmosphere for a period or periods aggregating more than 10 minutes in any one hour which is:
         a. Darker in shade than that designated on the U. S. Bureau of Mines Ringelmann Chart as: #1 (District M-1) #2 (District M-2)
         b. Of such opacity as to obscure vision to a degree equivalent to #1 of the Ringelmann Chart.
      2. Dust, lint, fumes, or other particulate matter resulting from industrial or commercial processes or operations:
         a. When emitted from chimneys, stacks, exhaust ducts, vents or other openings shall not exceed the maximum allowable discharge per hour shown in the following table:

Process weight per hour (See definition Section)	Maximum allowable discharge per hour Industrial Districts	
	M-1	M-2
100#	0.46#	No definite maximum allowable discharge is established for M-2 zone. However, existing industries shall not construct new facilities which would emit particulate at a higher rate of discharge than their existing facilities and further no industry may emit particulate matter which is so noxious or offensive as to
500#	1.77#	
1,000#	2.80#	
2,500#	4.64#	
5,000#	6.67#	
10,000#	10.00#	
20,000#	16.19#	
40,000#	28.30#	
60,000# or more	40.00#	

effect the continuation, extension or establishment of other lawful industries or businesses in its neighborhood.

b. When resulting from unenclosed operations such as quarrying, storage yards and similar outdoor operations, shall be so controlled that particulate matter does not normally blow onto adjacent property.

COOK COUNTY (ILL.) AIR POLLUTION
CONTROL ORDINANCE
(adopted October 1, 1963)

ARTICLE VI — SMOKE AND PARTICULATE MATTER

EMISSIONS BY ZONING

6.1 General

6.1-1 Compliance with Performance Standards

Any use of equipment, devices, or processes which emit smoke and/or particulate matter into the atmosphere shall comply with the performance standards governing smoke and particulate matter set forth hereinafter for the control zone in which such use shall be located, as established in Table 6, herein.

6.1-2 Compliance with Other Standards

In addition to the performance standards specified herein, the smoke and particulate matter shall meet the standards for toxic matter and noxious and odorous matter indicated in Articles VII and VIII, respectively.

6.2 Smoke Density Opacity Standards

6.2-1 Method of Measurement

Density or equivalent opacity of smoke shall be measured by the Ringelmann Chart, published and used by the United States Bureau of Mines. Measurements shall be taken at the point of greatest density, which shall usually be at the point of emission.

6.2-2 Maximum Density Allowed

The emission of smoke or particulate matter of a density greater than No. 2 on the Ringelmann Chart is prohibited at all times, except as provided for hereinafter.

6.2-3 Performance Standards by Control Zone

Smoke density emission shall conform to the requirements of Table 6 according to the control zone location of the source.

6.3 Particulate Matter Standards

6.3-1 General

Particulate matter emission into the atmosphere shall be relative to lot size and location.

6.3-2 Size Limitations

The emission from all source within any lot area of particulate matter containing more than 10 percent by weight of particles having a diameter larger than 44 microns is prohibited.

6.3-3 Maximum Weight of Emission

The total emission weight of particulate matter from all fuel-burning, combustion, or process equipment or devices within the boundaries of any lot shall not exceed those values given in Table 6. In addition, the dust loading of gas leaving an air pollution source, when measured in accordance with the provisions of ASME PTC 27 - Determining Dust Concentrations in a Gas Stream, 1957 edition, shall not exceed 0.35 grains per cubic foot of gas (S.T.P.). For combustion processes this measurement shall be computed at 50 percent excess air.

6.3-4 Method of Measurement

Determination of the total net rate of emission of particulate matter within the boundaries of any lot shall be made as follows:

a. Determine the maximum emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

b. From each gross hourly rate of emission derived in (a), above, deduct the correction factor (interpolating as required) for height of emission set forth in the table, thereby obtaining the net rate of emission in pounds per acre per hour from each source of emission.

c. Add together the individual net rates of emission derived in (b), above, to obtain the total net rate of emission from all sources of emission within the boundaries of the lot. Such total shall not exceed the limitations established in Table 6.

TABLE 6.
PERFORMANCE STANDARDS BY CONTROL ZONE

Allowance for Height of Emission*

Height of Emission Above Grade (Feet)	Correction (Pounds Per Hour Per Acre)
50	0.01
100	0.06
150	0.10
200	0.16
300	0.30
400	0.50

* Interpolate for intermediate values not shown in table.

ZONE 1

Includes all Residential and Business Districts and the M1 Manufacturing District, as established and defined in the Cook County Zoning Ordinance

SMOKE DENSITY In Zone 1, the emission of more than 20 smoke units per hour per stack is prohibited, including smoke of a density in excess of Ringelmann No. 2. However, once during any six-hour period each stack may emit up to 35 smoke units - not to exceed Ringelmann No. 2, - when blowing soot or cleaning fires. Only during fire-cleaning periods, however, shall smoke of Ringelmann No. 3 be permitted, and then for not more than four (4) minutes per period.

PARTICULATE MATTER — The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of one pound per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factor set forth in Table 6.

ZONE 2

Includes the M2 and M4 Manufacturing Districts, as established and defined in the Cook County Zoning Ordinance.

SMOKE DENSITY — In Zone 2, the emission of more than 50 smoke units per hour per stack is prohibited, including smoke of a density in excess of Ringelmann No. 2. However, once during any three-hour period each stack may emit up to 62 smoke units - not to exceed Ringelmann No. 2 - for blowing soot and for cleaning fires. Only during fire-cleaning periods, however, shall smoke of a density of Ringelmann No. 3 be permitted, and then for not more than four (4) minutes per period.

PARTICULATE MATTER — The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of three (3) pounds per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factor set forth in the following table:

Allowable for Height of Emission*

Height of Emission Above Grade (Feet)	Correction (Pounds Per Hour Per Acre)
50	0
100	0.5
150	0.8
200	1.2
300	2.0
400	4.0

* Interpolate for intermediate values not shown in table.

ZONE 3

Includes the M3 Manufacturing District as established and defined in the Cook County Zoning Ordinance.

SMOKE DENSITY — In Zone 3, the emission of more than 76 smoke units per hour per stack is prohibited, including smoke of an intensity greater than Ringelmann No. 2. However, once during any two-hour period each stack may emit up to 92 smoke units - not to exceed Ringelmann No. 2 - for blowing soot and for cleaning fires. Only during fire-cleaning periods, however, shall smoke of a density of Ringelmann

No. 3 be permitted, and then for not more than six (6) minutes per period.

PARTICULATE MATTER

The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of eight (8) pounds per acre during any one hour, after deducting from the gross hourly emission per acre the correction factor set forth in the following table:

Allowance for Height of Emission*

Height of Emission Above Grade (Feet)	Correction (Pounds Per Hour Per Acre)
50	0
100	0.5
150	1.5
200	2.4
300	4.0
400	8.0

* Interpolate for intermediate values not shown in table.

ARTICLE VII

TOXIC MATTER

No activity or operation shall cause, at any time, the discharge of toxic matter into the atmosphere in such concentrations as to be detrimental to or endanger the public health, safety, or welfare, or cause injury or damage to property or business or be needlessly destructive of any insect, plant, or animal life which contributes to the general welfare.

ARTICLE VIII

NOXIOUS AND ODOROUS MATTER

8.1 General

The emission of noxious and odorous matter in such manner or quantity as to be detrimental to or endanger the public health, comfort, or welfare is prohibited.

8.2 Odor-Performance Standards

8.2-1 In addition to the requirements of Section 8.1, odorous matter shall meet the requirements of Table 8, below.

TABLE 8.

EMISSION OF ODOROUS MATTER

By Control Zone

ZONE 1

Includes all Business Districts and the M1 Manufacturing District, as established and defined in the Cook County Zoning Ordinance.

The emission of matter in such quantities as to be readily detectible as odorous matter at any point along lot lines is prohibited.

ZONE 2

Includes the M2 and M4 Manufacturing Districts, as established and defined in the Cook County Zoning Ordinance.

The emission of matter such quantities as to be readily detectible as odorous matter at any point along district boundary lines when diluted in ratio of one volume of odorous air to four (4) volumes of clean air is prohibited.

ZONE 3

Includes the M3 Manufacturing District, as establisned and defined in the Cook County Zoning Ordinance.

The emission of matter in such quantities as to be readily detectible as odorous matter at any point along district boundary lines when diluted in ratio of one volume of odorous air to twenty (20) volumes of clean air is prohibited.

8.2-2 The odor of growing trees, shrubs, plants, flowers, grass, and cut grass left in place shall not be considered odorous within the meaning of this ordinance.

8.2-3 Odors, smoke, and fumes incidental to domestic gardening, such as fertilizers and insecticides (but not compost piles) shall not be considered odorous or noxious within the meaning of this ordinance.

8.3 Internal Combustion Engines

No person shall operate or cause to be operated upon any street, highway, public place, stream, or waterway, or any private premises, any internal combustion engine of any motor vehicle, boat, or other vehicle, while stationary or moving, which emits from any source unreasonable and/or excessive smoke, obnoxious, or noxious gases, fumes, or vapors.

E. PERFORMANCE STANDARDS - SMOKE AND PARTICULATE MATTER

Any use established in a Manufacturing District* shall be so operated as to comply with the performance standards governing smoke and particulate matter set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or further conflict with, the performance standards governing smoke and particulate matter established hereinafter for the district in which such use is located.

In addition to the performance standards specified hereinafter, the emission of smoke or particulate matter in such manner or quantity as to endanger or to be detrimental to the public health, safety, comfort, or welfare is hereby declared to be a public nuisance and shall henceforth be unlawful.

For the purpose of grading the density of smoke the Ringelmann Chart published and used by the United States Bureau of Mines shall be employed. The emission of smoke or particulate matter of a density greater than No. 2 on the Ringelmann Chart is prohibited at all times except as otherwise provided hereinafter.

The emission, from all sources within any lot area, of particulate matter containing more than ten percent by weight of particles having a particle diameter larger than 44 microns is prohibited.

Dust and other types of air pollution, borne by the wind from such sources as storage areas, yards, roads and the like within lot boundaries, shall be kept to a minimum by appropriate landscaping, paving, oiling, fencing, or acceptable means. Emission of particulate matter from such sources in excess of the weight limitations specified hereinafter is prohibited.

1. Smoke - M1 District.

a. The emission of more than ten smoke units** per hour per stack is prohibited, including smoke of a density in excess of Ringelmann No. 2. However, during one one-hour period in each 24-hour day, each stack may emit up to 20 smoke units when blowing soot or cleaning fires. Only during fire-cleaning periods, however, shall smoke of Ringelmann No. 3 be permitted, and then for not more than four minutes.

b. The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of one pound per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factors set forth in Tables 2, 3, and 4, below, for height, velocity and temperature of emission, respectively. Determination of the total net rate of emission of particulate matter within the boundaries of any lot shall be made as follows:

---

* M1 and M2 Manufacturing District represent two zones of different restrictions, whereby any industry may be placed in either district, providing that it can meet the zone restrictions, as listed below.

**See Definition Section at the beginning of this report.

(1) Determine the maximum emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

(2) From each gross hourly rate of emission derived in (1), above, deduct the appropriate correction factor (interpolating as required) for height, velocity, and temperature of emission set forth in Tables 2, 3, and 4, thereby obtaining the net rate of emission in pounds per acre per hour from each source of emission.

(3) Add together the individual net rates of emission derived in (2) above, to obtain the total net rate of emission from all sources of emission within the boundaries of the lot. Such total shall not exceed one pound per acre of lot area during any one hour.

TABLE 2

ALLOWANCE FOR HEIGHT OF EMISSION*

Height of Emission Above Grade (Feet)	Correction (Pounds per Hour per Acre)
50	0.01
100	0.06
150	0.10
200	0.16
300	0.30
400	0.50

* Interpolate for intermediate values not shown in table.

TABLE 3

ALLOWABLE FOR VELOCITY OF EMISSION*

Exit Velocity (Feet per Second)	Correction (Pounds per Hour per Acre)
0	0
20	0.03
40	0.09
60	0.16
80	0.24
100	0.50

* Interpolate for intermediate values not shown in table.

TABLE 4

ALLOWANCE FOR TEMPERATURE OF EMISSION*

Temperature of Emission (Degrees Fahrenheit)	Correction (Pounds per Hour per Acre)
200	0
300	0.001
400	0.002
500	0.003
1,000	0.01
1,500	0.04
2,000	0.10

* Interpolate for intermediate values not shown in table.

2. Smoke - M2 District.

a. The emission of more than 20 smoke units per hour per stack is prohibited, including smoke of a density in excess of Ringelmann No. 2. However, during four one-hour periods in each 24-hour day each stack may emit up to 30 smoke units, twice for cleaning fires. During fire-cleaning periods only, smoke of a density of Ringelmann No. 3 shall be permitted and then not for more than four minutes per period.

b. The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of three pounds per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factors set forth in Tables 5, 6, and 7, below, for height, velocity, and temperature of emission respectively. Determination of the total net rate of emission of particulate matter within the boundaries of any lot shall be made as follows:

(1) Determine the maximum emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

(2) From each gross hourly rate of emission derived in (1) above, deduct the appropriate correction factor (interpolating when necessary) for height, velocity, and temperature of emission set forth in Tables 5, 6, and 7, which follow, thereby obtaining the net rate of emission in pounds per acre per hour from each source of emission.

(3) Add together the individual net rates of emission derived in (2) above, to obtain the total net rate of emission within the boundaries of the lot. Such total shall not exceed three pounds per acre during any one hour.

TABLE 5

ALLOWANCE FOR HEIGHT OF EMISSION*

Height of Emission Above Grade (Feet)	Correction (Pounds per Hour per Acre)
50	0
100	0.5
150	0.8
200	1.2
300	2.0
400	4.0

* Interpolate for intermediate values not shown in table.

TABLE 6

ALLOWANCE FOR VELOCITY OF EMISSION*

Exit velocity (Feet per Second)	Correction (Pounds per Hour per Acre)
0	0
20	0.3
40	0.8
60	1.2
80	1.6
100	2.4

* Interpolate for intermediate values not shown in table.

TABLE 7

ALLOWANCE FOR TEMPERATURE OF EMISSION*

Temperature of Emission (Degrees Fahrenheit)	Correction (Pounds per Hour per Acre)
100	0
200	0
300	0.005
400	0.01
500	0.02
1,000	0.10
1,500	0.30
2,000	1.0

* Interpolate for intermediate values not shown in table.

G. PERFORMANCE STANDARDS - ODORS

Any use established in a Manufacturing District shall be so operated as to comply with the performance standards governing odorous materials, set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or further conflict with, the performance standards governing odorous materials established hereinafter for the district in which such use is located.

1. Odors - M1 District. The emission of odorous matter in such quantities as to be readily detectable at any point along lot lines or as to produce a public nuisance or hazard beyond lot lines is prohibited.

2. Odors - M2 District. The emission of odorous matter in such quantities as to be readily detectable at any point along lot lines when diluted in the ratio of one volume of odorous air to four or more volumes of clean air, or as to produce a public nuisance or hazard beyond lot lines in prohibited.

COUNTY OF PORTER, INDIANA
1959 ZONING ORDINANCE
Ordinance No. 1959-1

SECTION 17

A. A Light Industrial Use is one which creates a minimum amount of nuisance outside the plant; is conducted entirely within enclosed buildings, does not use the open area around such buildings for storage of raw materials or manufactured products or for any other industrial purpose other than transporting goods between buildings; provides for enclosed loading and unloading facilities; and such use conforms to the following performance standards.

1. Smoke - The emission of more than ten (10) smoke units per hour per stack and emissions in excess of Ringelmann No. 2 are prohibited. However, once during any 24 hour period for soot blowing, process purging and fire cleaning, each stack shall be permitted an additional ten (10) smoke units, during which time smoke up to and including Ringlemann No. 3 is permitted.

2. Particulate Matter - The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of one pound per hour per acre, of which no more than ten percent (10%) by weight of particles larger than 44 microns (325 mesh) shall be allowed. Determination of the total net rate of emission shall be made as follows:

   a. Determine the maximum emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thus obtaining a gross hourly emission rate per acre.

   b. Deduct from the gross rate derived above, the appropriate correction factors for height of stack and stack velocity as listed in Tables I and II, thus obtaining the net rate of emission in pounds per hour per acre of each source.

   c. Add together the individual rates of emission derived above of each source to obtain the total net rate of emission from all sources within the boundaries of the lot. Dust and other types of air pollution, borne by the wind from such sources as storage areas, yards, roads and the like within lot boundaries, shall be kept to a minimum by appropriate landscaping, paving, oiling, fencing, or other acceptable means.

3. Odor - No activity or operation shall permit odors to be released which shall be detectable at the lot line.

TABLE I

ALLOWANCE FOR HEIGHT OF EMISSION*

Height of Emission Above Grade (Feet)	Correction (Pounds per Hour per Acre)
50	0.01
100	0.06
150	0.10
200	0.16
300	0.30
400 and above	0.50

* Interpolate for intermediate values.

TABLE II

ALLOWANCE FOR VELOCITY OF EMISSION*

Exit Velocity Up (Feet per Second)	Correction (Pounds per Hour per Acre)
0	0
20	0.03
40	0.09
60	0.16
80	0.24
100 and above	0.50

* Interpolate for intermediate values.

4. Toxic and noxious materials - The emission of toxic and noxious materials shall not exceed the quantities determined by the following formula:

$$Q = 36\ Cx^2 \qquad \text{where}$$

Q is the maximum permitted quantity of toxic material emitted in the four hour period having the greatest average concentration (cubic feet):
C is the threshold limit value for toxic materials in industry (parts per million by volume) as set forth in "Threshold Limit Values for Toxic Materials in Industry", 1955, issued by the Indiana State Board of Health, Division of Industrial Hygiene;
x is the nearest distance in thousands of feet of the stack, vent, flue or other discharge point to a Residence or Business District boundary line $\left(\frac{\text{ft.}}{1000}\right)$.

When C is given as milligrams per cubic meter, multiply this figure by 0.061, place it in the above formula and obtain Q in pounds permitted in four hours. If the material is emitted from open piles, ponds, tanks, areas, etc., the maximum permitted concentration measured at a Residence

District boundary line shall be 10 percent of the threshold limit value C.

5. Glare and Heat - Does not pertain to this report.

6. Vibration - Does not pertain to this report.

7. Noise - Does not pertain to this report.

8. Fire Hazards - Does not pertain to this report.

B. A General Industrial Use is one which requires both buildings and open area for manufacturing, fabricating, processing, extraction, heavy repairing, dismantling, storage or disposal of equipment, raw materials, manufactured products or wastes, and land and/or buildings in this District shall be used so as to comply to the following performance standards.

1. Smoke - The emission of more than thirty (30) smoke units per hour per stack and emissions in excess of Ringelmann No. 2 are prohibited. However, once during any six hour period, for soot blowing, process purging and fire cleaning, each stack shall be permitted an additional ten (10) smoke units, during which time smoke up to and including Ringelmann No. 3 is permitted.

2. Particulate Matter - The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of three pounds per hour per acre, of which no more than ten percent (10%) by weight of particles larger than 44 microns (325 Mesh) shall be allowed. Determination of the total net rate of emission shall be made as follows:

a. Determine the maximum emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thus obtaining a gross hourly emission rate per acre.

b. Deduct from the gross rate derived above, the appropriate correction factors for height of stack and stack velocity as listed in Tables IV and V, thus obtaining the net rate of emission in pounds per hour per acre of each source.

c. Add together the individual rates of emission derived above of each source to obtain the total net rate of emission from all sources within the boundaries of the lot. Dust and other types of air pollution, borne by the wind from such sources as storage areas, yards, roads and the like within lot boundaries, shall be kept to a minimum by appropriate landscaping, paving, oiling, fencing or other acceptable means. Emission of particulate matter from such sources in excess of the weight limitations specified herein is prohibited.

3. Odor - No activity or operation shall permit odors to be released which shall be detectable at any Residence District boundary line. In addition, such odor, when measured at the lot line, shall be rendered undetectable by mixing one volume of the odorous air with four volumes of clean air.

4. Toxic and noxious materials - The emission of toxic and noxious materials shall not exceed the quantities determined by the following formula:

$Q = 90\ Cx^2$ where

Q is the maximum permitted quantity of toxic material emitted in the four hour period having the greatest average concentration (cubic feet). C is the threshold limit value for toxic materials in industry (parts per million by volume) as set forth in "Threshold Limit Values for Toxic Materials in Industry", 1955, issued by the Indiana State Board of Health, Division of Industrial Hygiene.

TABLE IV

ALLOWANCE FOR HEIGHT OF EMISSION*

Height of Emission Above Grade (Feet)	Correction (Pounds per Hour per Acre)
50	0.02
100	0.12
150	0.20
200	0.32
300	0.60
400	1.00
500 and above	1.50

* Interpolate for intermediate values.

TABLE V

ALLOWANCE FOR VELOCITY OF EMISSION*

Exit Velocity Up (Feet per Second)	Correction (Pounds per Hour per Acre)
0	0
20	0.06
40	0.18
60	0.32
80	0.48
100 and above	1.00

* Interpolate for intermediate values.

x is the nearest distance in thousands of feet of the stack, vent, flue or other discharge point to a Residential or Business District boundary line $\left(\frac{\text{ft.}}{1000}\right)$.

When C is given as milligrams per cubic meter, multiply this figure by 0.061, place it in the above formula and obtain Q in pounds permitted in four hours. If the material is emitted from open piles, ponds, tanks, areas, etc., the maximum permitted concentration measured at a Residence District boundary line shall be 25 percent of the threshold limit value C.

5. Glare and Heat - Does not pertain to this report.

6. Vibration - Does not pertain to this report.

7. Noise - Does not pertain to this report.

8. Fire Hazard - Does not pertain to this report.

9. Water Pollution - Does not pertain to this report.

C. A Heavy Industrial Use is one which requires both buildings and open area for manufacturing, fabricating, processing, extraction, heavy repairing, dismantling, storage or disposal of equipment, raw materials, manufactured products or wastes and one which will comply with the following performance standards.

1. Smoke - The average emission of more than ninety (90) smoke units per hour per stack, for all smoke stacks on the lot, and emission of smoke in excess of Ringelmann No. 3 are prohibited. However, this restriction shall not apply to fire building, soot blowing, process purging and fire cleaning which will be permitted once during any two hour period, except that where there are more than ten (10) smoke stacks on a lot, this provision will apply to not more than twenty (20) percent of such stacks at any one time.

2. Particulate Matter - The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of six (6) pounds per hour per acre, of which no more than sixty (60) percent by weight of particles larger than 44 microns (325 mesh) shall be allowed. Determination of the total net rate of emission shall be made as follows:

a. Determine the emission in pounds per hour from each source of emission and divide this figure by the number of acres of lot area - thus obtaining a gross hourly emission rate per acre.

b. Deduct from the gross rate derived above, the appropriate correction factors for height of stack and stack velocity as listed in Tables VII and VIII, thus obtaining the net rate of emission in pounds per hour per acre of each source.

c. Add together the individual rates of emission derived above of each source to obtain the total net rate of emission from all sources within the boundaries of the lot. Dust and other types of air pollution, borne by wind from such sources as storage areas, yards, roads and the like within lot boundaries, shall be kept to a minimum by appropriate landscaping, paving, oiling, fencing or other acceptable means. Emission of particulate matter from such sources in excess of the weight limitations specified herein is prohibited.

3. Odor - No activity or operation shall permit odors to be released which which shall create a nuisance at a Residence District boundary.

4. Toxic and noxious material - The emission of toxic and noxious materials shall not produce concentrations exceeding 30% of the threshold limit value for toxic materials in industry (parts per million by volume) as set forth in "Threshold Limit Values for Toxic Materials in Industry", 1955, issued by the Indiana State Board of Health, Division of Industrial Hygiene, at a Residence or Business District boundary.

5. Glare and Heat - Does not pertain to this report.

6. Noise - Does not pertain to this report.

7. Fire Hazards - Does not pertain to this report.

8. Water Pollution - Does not pertain to this report.

TABLE VII

ALLOWANCE FOR HEIGHT OF EMISSION*

Height of Emission Above Grade (Feet)	Correction (Pounds per Hour per Acre)
50	0.03
100	0.18
150	0.30
200	0.48
300	0.90
400	1.50
500 and above	2.25

* Interpolate for intermediate values.

TABLE VIII

ALLOWANCE FOR VELOCITY OF EMISSION*

Exit Velocity Up (Feet per Second)	Correction (Pounds per Hour per Acre)
0	0
20	0.09
40	0.27
60	0.48
80	0.72
100 and above	1.50

* Interpolate for intermediate values.

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